

FLIGHT

The
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AND AIRSHIPS

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EDITORIAL COMMENT



THE Fédération Aéronautique Internationale has vindicated its reputation as the guardian of international flying sport. We felt certain that it would do so, and that its previous wobbling was due to the general and natural upset caused by the untimely death of its late President, the Comte de Vaulx. The Sports Committee of the F.A.I. has upheld the principle for which the Royal Aero Club of the United Kingdom contended, that once the rules of the next Schneider contest had been drawn up and published, no alteration in them was permissible. The latest date for making an entry for the contest is December 31, 1930, and the "deposit"

to accompany each machine is to be, as originally fixed, 200,000 francs per machine. This deposit may be made in cash or by means of a banker's guarantee. The deposit is, of course, returnable when the machine in question is presented to the committee of the organising club on the day of the contest. This provision will safeguard the organising club, which is in this case the British club, against the chance of loss in the case of last-minute withdrawals. No hardship at all is inflicted on clubs which make a serious entry and fulfil their intentions. To them it is of no consequence whether the deposit is small or large.

Now that the discussion has come to an end, we prefer that the matter should be forgotten as quickly as possible. It was never anything but a most amicable discussion, so far as the representatives of Great Britain, Italy and France were concerned. It was only in certain sections of the press of some of the countries that any rancour was displayed; and we all know that journalists at times get excited and let their enthusiasm run away with their calmer judgment.

These things, we repeat, are better forgotten. Still, it is, perhaps, necessary to mention, as briefly as possible, the actual happenings which have been ended by Monday's meeting of the Sports Committee of the F.A.I.

DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1930	
Dec. 5	.. No. 3 Squadron R.A.F. Officers' Reunion Dinner, Trocadero.
Dec. 5	.. Ground Engineers' Lecture, by S. J. Norton, before Westland Aircraft Soc.
Dec. 11	.. "Axial Engines," Lecture by M. L. Bramson, before R.Ae.Soc.
Dec. 11	.. "Float and Boat Seaplanes," Lecture, by Mr. Jackson, before Westland Aircraft Soc.
Dec. 11	.. Association Football: R.A.F. v. Fulham, at Fulham.
Dec. 12	.. Hampshire Ae.C. Dinner and Dance at South Western Hotel, Southampton.
Nov. 28- Dec. 14	.. Paris Aero Show.
Dec. 17	.. "Soaring Bird Flight," Lecture by Sir G. Walker, before London Gliding Club.
Dec. 25-26	.. Association Football: R.A.F. Channel Islands Tour, Jersey.
1931	
Jan. 2	.. "Evaporative Cooling of Aero Engines," Lecture, by J. E. Ellor, before R.Ae.S., Hull.
Jan. 7	.. "Early Aviation," Lecture by E. C. Gordon England, before London Gliding Club.
Jan. 8	.. "Aircraft Production Methods in America," Lecture, by R. A. Bruce, before Westland Aircraft Soc.
Jan. 14	.. "Armoured Cars in Desert Warfare," R.U.S.I. Lecture, by Sqdn.-Ldr. G. E. Godsave, 3 p.m.
Jan. 17	.. Association Football: R.A.F. v. Corinthians, W-combe.
Jan. 22	.. "Model Aeroplanes," Lecture, by W. Rigby, before Westland Aircraft Soc.

In January last the Sports Committee of the F.A.I. agreed to the British proposal that the amount of deposit should be raised to 200,000 francs. Another British proposal, namely that the last date for receiving entries should be July 31 instead of December 31, was referred back to the General Conference of the F.A.I. for consideration. This General Conference met early in June, and did not accept the earlier date for receiving entries. December 31 remained the latest date on which they may be received. Very injudiciously, however, this General Conference permitted a fresh discussion on the amount of the deposit, and decided that entries made before July 31 need only be accompanied by a deposit of 5,000 francs per machine, though later entries must be accompanied by the higher deposit. The British representatives protested that the General Conference was acting *ultra vires* in altering the rules drawn up and published by the Sports Committee. When, first, Italy and, later, France offered entries accompanied by the lower rate of deposit, the British Aero Club held that these did not constitute valid entries, and declined to accept them. The deposit money was returned. There was some talk of invoking a special Appeal Committee, but neither the Italian nor the French clubs entered formal appeals against the action of the British club, and so the Appeal Committee was not invoked. This week's meeting of the F.A.I. Sports Committee has reaffirmed the decisions of the meeting of last January, which is very much to the advantage of international air sport. We need say no more than that. It is very gratifying to be able to add that the French and Italian representatives have accepted this ruling, and so there will be no more discussion of this point. We are all, as before, very good friends.

It now remains to be seen what will happen. No entries have yet been officially received by the Royal Aero Club of the United Kingdom for the 1931 contest, but there still remain four weeks in which they may be lodged. In view of the forwardness of the preparations made by France and Italy, there is not much doubt that both these countries will send in entries.

We have the utmost respect for Italy as a competitor in the Schneider contest. Her victory over the United States in 1926 was a magnificent achievement, and though we are very proud of our victory over Italy in 1927 at Venice, we shall never forget that the contest of 1929 at Calshot was a very much closer thing than the record of the lap times shows. Italy suffered grievous misfortunes during her training, and up to the very last moment we only just escaped disastrous misfortunes by the proverbial skin of our teeth. Had that damage to the cylinder in the engine on Waghorn's machine not been discovered on the eve of the speed contest, and had it not been possible, by almost superhuman efforts, to change the whole block during that night, the race of 1929 would have been won by the late Maresciallo Dal Molin. We have no doubt that the sporting Italian pilots would have regretted such a result, but their regret would not have been nearly so deep as was our sorrow at the sad fatality which prevented their best pilot and most trusted seaplane from taking part in the race.

It will be a great pleasure to us to see a French team enter once more for a Schneider Contest. The trophy came from France, and it is a strange thing that it

has only once been won by a French seaplane. The last time that a French Schneider team visited Great Britain was in 1923, and it met with a series of misfortunes. None the less, the pluck shown by M. Hurel in taking off and making an effort to race in a seaplane which he knew was not sound was an example of typical French spirit.

And what of our own team for the 1931 contest? Certainly no new seaplanes will be built for the contest. If we are to defend the trophy, we must make shift with the seaplanes built two years ago, and do the best we can with them against the latest products of Italy and France. That would seem to be a sufficient handicap for Great Britain, but none the less we have good grounds for hoping that the Supermarine-Rolls Royce S6 and the Gloster-Napier 6 will be equal to the demands made upon them, provided that they are flown by pilots fully trained for the race and fully familiar with the machines. It is well known that a racing seaplane is never quite at its best on the day of the race for which it was designed. During the practice the designer has found out any number of things which would improve the performance of the machine, if only he had time to incorporate them—but he has not. Since the last Schneider race was held there has been time to improve both the Supermarine and the Gloster, as well as both their engines. It would be splendid to see both those types racing when in the highest fettle, and if they did win, the glory won for British design would be greater than any ever won before.

The main question now is the men. The French and the Italian teams will have behind them all the resources of their respective Air Ministries. Against such resources it would be practically hopeless for any private British effort to make a fair show. A team of civilian pilots seems therefore out of the question. The best civilian pilots are all in regular employ, and could not be spared to go into intensive training for the Schneider contest. Moreover, youth is an essential for high-speed flying, and our previous champions are not so young as they once were. The matter resolves itself to this: the trophy must be defended by Royal Air Force pilots or it cannot be seriously defended at all.

The Schneider committee of the Royal Aero Club is shortly to confer with the Air Council on the whole position. The conference will be momentous, and it may decide for good and all the fate of the Schneider contest.

A British win next year would leave the trophy permanently in our hands. At one time it would have seemed a tragedy that this series of contests should come to an end. But now we should not be averse to see that happen, and a new international contest instituted under different regulations. If the Air Council will make this one effort, that result may be brought about. As no new machines are contemplated, the expense to the public funds will not be anything like so great as in previous years. Still, with the new machines against us, a full effort will be needed if Great Britain is to win the trophy outright. If that effort is not made, we may have to endure the indignity of seeing the contest held in British waters without any British team to defend the cup. That would cut our national pride to the quick, would damage our reputation in the eyes of the world, and would certainly not increase the popularity of the Air Ministry.

The PARIS AERO SHOW



TWO impressions stand out clearly after a visit to the Grand Palais des Champs-Élysées, where the 12th International Aero Show is now being held.

The first is that civil types of aircraft form a very much larger percentage than they have done at any Paris Aero Show since the war, and the second is that among the civil aircraft there is a marked increase in size. In fact, this year's Show is remarkable for the number of large machines exhibited. This is not, perhaps, to be wondered at if one remembers that private flying is nowhere, anything like as greatly developed, as it is in Great Britain. In France, the Air Ministry decided some time ago to grant a subsidy to private flying, and this took the form of a grant of a certain large percentage of the purchase price of the machine. The effects of this subsidy have hardly had time to make themselves felt yet, although it is easy to sense that French aircraft constructors are not overlooking the fact that machines suitable for the private owner will be wanted in the near future, and many of them have produced types ready for the expected demand. But the stage has not been reached when any great amount of business is being done on the stands. We believe that the De Havilland Company have, perhaps, done more business than anyone else in the small machine class, as a result of showing a "Puss Moth" on the Morane-Saulnier stand. Generally speaking, however, the exhibitors do not seem to show a great deal of faith in the machine for the private owner. As far as the French constructors are concerned, they do appear to be fully alive to the great possibilities of commercial aviation, and there is scarcely a firm which is not exhibiting at least one civil type of aircraft. Many are showing more than one type.

If one looks around the Grand Palais, the first impression is one of confusion and overcrowding. This is probably to some extent due to the great number of large machines, many of which encroach on the stands adjoining, but is also caused by a re-arrangement of the stands. In previous years the gangways have been on the extreme outskirts, against the pillars of the gallery. This year the spaces near the gallery are stands, and the gangways are placed further inwards. The decorations are simpler this year, which is an advantage most appreciated by the photographers, as much more daylight is available than was formerly the case. But decoratively speaking, one rather misses some of the very beautiful effects of previous years.

Coming to the subject of the aeroplanes themselves, the main note of the 1930 Paris Aero Show is one of sameness. The absence of the freaks which have been such a prominent feature of many a Paris exhibition in the past will be regretted by no one. But the lack of extravagant-design has become almost a lack of original design. It is scarcely a question of copying. The unfortunate aircraft designer is in a very difficult position, because if he produces something original his machines are at once dubbed freaks, and if he is orthodox

he will most likely be accused of copying other people. For example, the general Fokker design, *i.e.*, the single or three-engined cantilever monoplane, is almost the dominating type at the Grand Palais this year. In detail, the machines vary greatly from the Fokker, but in a general way many of them are of the general Fokker type of machine. And if the designer puts his cantilever wing down to the bottom of the fuselage, he is at once accused of copying Junkers. So what is he to do? The biplane type, which has been the most popular in Great Britain for many years, has inspired but few designers, and certainly if the Paris Show can be taken as a guide, the cantilever monoplane is the type of the immediate future. In the Grand Palais one sees it in large numbers, and in large sizes. And there is no doubt that for general appearance the type looks "clean." Whether it really is very much cleaner in an aerodynamic sense is probably open to discussion. But it *looks* clean and simple and straightforward. And there is no rigging to be maintained during service. So that the appeal which the type is beginning to have is readily understood.

When it comes to translating the cantilever wing into a structure, there seems to be a diversity of opinion among designers. The all-metal construction is certainly gaining favour, but as yet it has by no means entirely ousted the ply-covered wing. If anything, metal construction seems to have gathered more headway in fuselages than in wings and the metal fuselage with wooden wings is still very popular.

Of real improvements, or rather, attempts at improvements, in aerodynamic design there is little enough evidence. Bleriot has produced and is exhibiting a large cantilever monoplane commercial machine with two fuselages (this was illustrated in *FLIGHT* last week.—Ed.), the undercarriages being all but buried inside the fuselages. Whether the drag of two smaller fuselages, with the wheels buried, is smaller than that of one larger fuselage with the undercarriage exposed, is difficult to judge. It may be recollected that some years ago we described in *THE AIRCRAFT ENGINEER* a design by Mr. James V. Martin which achieved a maximum L/D of 19 by retracting its undercarriages into the two fuselages. But in the Martin monoplane the engines were in the noses of the fuselages. In the Bleriot they are mounted in tandem in the wing, between the fuselages, and the space between them is the pilot's cockpit. This arrangement certainly gets the two fuselages out of the slipstreams, but it transfers the slipstream of the forward engine to the centre of the wing.

The second serious attempt to reduce drag is represented by the little Couzinet three-engined touring machine. This is a low-wing monoplane with three 40-h.p. Salmson engines, and the undercarriages retract into the outboard engine casings. At least the wheels do. The three chassis members, telescopic leg, radius rod and axle, still lie exposed, some 1-2 in. from the lower surface of the wing, and it is quite

conceivable that the disturbance of the flow over the wing caused in this way may give rise to as great resistance as if the undercarriage was hanging down in the normal way. However, it is not a difficult matter to imagine a rearrangement by which this particular design could be modified so as to bury the undercarriages completely. At least the Couzinet represents an attempt to get away from the usual 7-1 L/D ratio and to get something a little better. It is only by striving that we get anywhere. And if we are to make any real progress, as distinct from taking the very easy way out by piling on horse-power, it is very necessary to use every possible means of drag reduction which seems to promise results.

It was expected that this year's Paris Show would be of a truly International character, as Great Britain, U.S.A., Germany, Holland and Poland are showing. Actually, the foreign representation is such that the exhibition leaves one with the feeling that it is almost entirely a French show. This is mainly due to the fact that with few exceptions the foreign aircraft firms are not in the main hall, but have been pushed out under the gallery, where they do not figure in the general ensemble. Germany is represented on the main stands by a Dornier "Superwal." Holland is represented by two Fokkers.

These three machines, and the "Puss-Moth" on the Morane-Saulnier stand, are the only foreign machines which are not relegated to a position of side shows. A Ford trimotor monoplane was to have been shown, but would not go through the door of the Grand Palais, and permission to tear down the walls could not, presumably, be obtained! So the U.S.A. are not represented. Germany, Dornier apart, is showing mainly models (there are a Junkers "Junior"

and a B.F.W. in actual size, and a half-size Klemm), and Great Britain, the "Puss-Moth" apart, is represented by an "Atlas" and a "Bulldog" on stands out in the sides, under the gallery.

Of the aero engines, the radial air-cooled type is easily the most popular, but some very fine examples of water-cooled engines are to be seen. In the matter of engines, Great Britain makes an excellent show, and our engine constructors are on a more even footing with the French than is the case with aircraft, the stands being as well situated as are the French.



A general view in the Grand Palais, looking north. In the foreground may be seen the wings of the Fokker F. IX and the Caudron three-engined monoplane. (Flight Photo.)



General view from the gallery, looking south. (Flight Photo.)

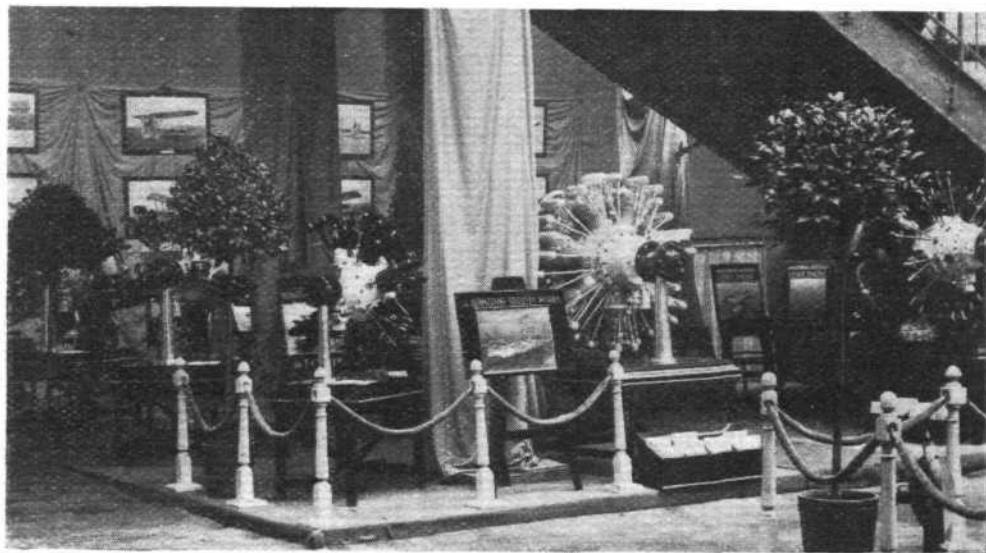
The British Section

IN the notes which follow, the British exhibits will be dealt with in alphabetical order to facilitate reference, and in the two cases where firms are showing both aircraft and engines, the two are dealt with together

ARMSTRONG WHITWORTH

The Armstrong Whitworth Aircraft Exhibit

THE main exhibits from Sir W. G. Armstrong Whitworth Aircraft Co., Ltd., on Stand 24 Grand Aisle, are a complete Atlas Army Corporation Aircraft, an uncovered front portion of the fuselage, a lower main plane, and an aileron. In addition, there is their proof-loading test machine and also several cases containing sections of spars and ribs built up on their patented system of sheet construction. The Atlas is fitted with the Jaguar IV C, and is of the same type which has been supplied to the R.A.F. in large numbers. Its somewhat elaborate equipment includes two guns, a camera, complete wireless gear, and message picking-up apparatus, and it is also arranged so that it can be used for bombing operations, while by fitting extra tanks it is suitable for long-distance reconnaissance. As an advanced two-seater training machine the front and rear cockpits are similarly fitted, the controls and instruments being duplicated. The Atlas has also been fitted with metal floats, and, with a geared Jaguar engine, it makes a successful seaplane with a quick take-off. As a two-seater fighter it is fitted with the geared Jaguar Major engine, either plain or supercharged, according to the desired altitude of action. The uncovered portion of the front fuselage clearly shows the



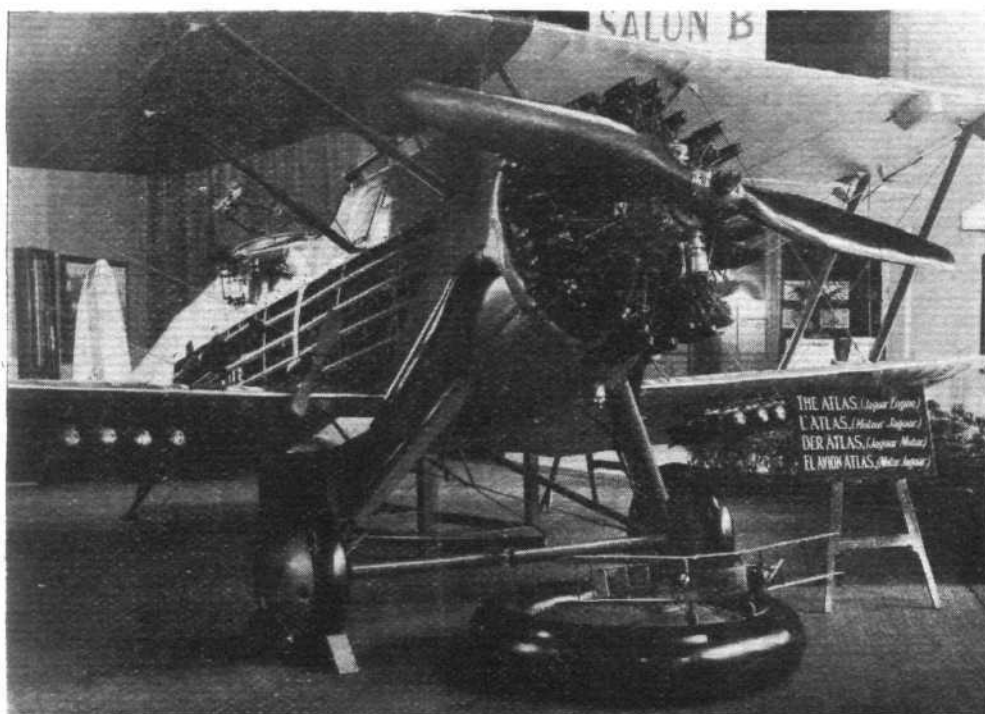
The Armstrong Siddeley engine stand. The Jaguar Major is on the left of the entrance and the Double Mongoose on the right of the entrance.

(FLIGHT Photo.)

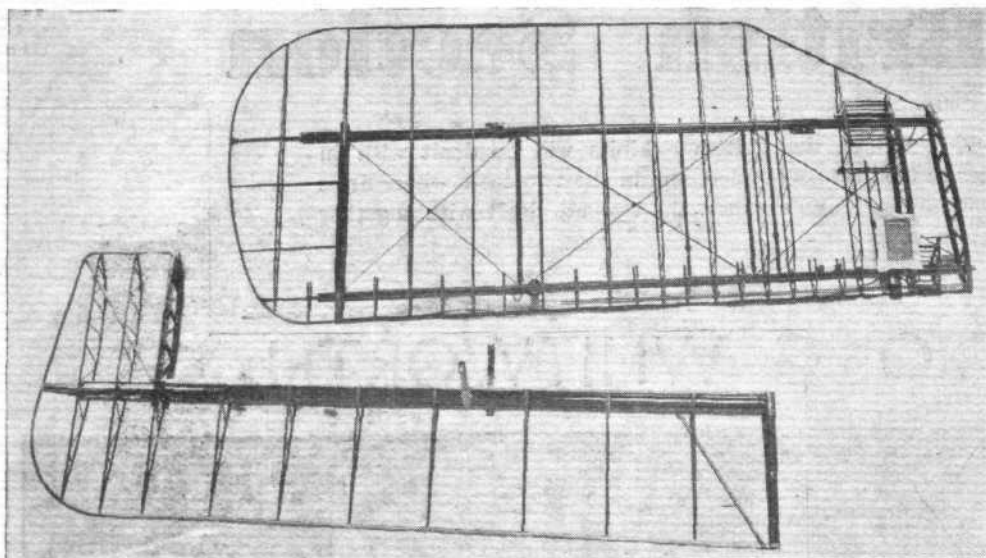
method adopted for joining the high-tensile steel tubes without the use of welding. This form of construction enables repairs to be made without the use of special tools or appliances. Both the lower main plane and the aileron, though uncovered, are complete with controls and wiring, and are excellent examples of this form of steel construction. Proof loading of an Atlas spar is demonstrated by supporting a 15 length of spar at its ends and applying a load of 500 lb. at the centre. The outside fibre stress is 55 tons per sq. in., and the deflection under load is 6 in., the spar is 3½ in. deep, and to pass the test there must be no permanent set when the load is removed.

The Armstrong Siddeley Engine Exhibit

Two new Armstrong Siddeley aero engines are making their first public appearance at the show on Stand No. 1, Gallery A. These are the 140-h.p. seven-cylinder Genet Major, and the 350-h.p. 10-cylinder double Mongoose. The seven-cylinder Genet Major is an extension of the five-cylinder Genet Major, using the same cylinders, namely, 108 by 114 mm.—thus increasing the capacity from 5.23 litres to 7.32. Both this and the double Mongoose engine were recently described in FLIGHT. The latter engine is composed of 10 cylinders of the same size as their larger and better known Jaguar engine (127 by 139.7 mm.), giving a capacity of 17.72 litres. This engine is geared and fitted with a paddle



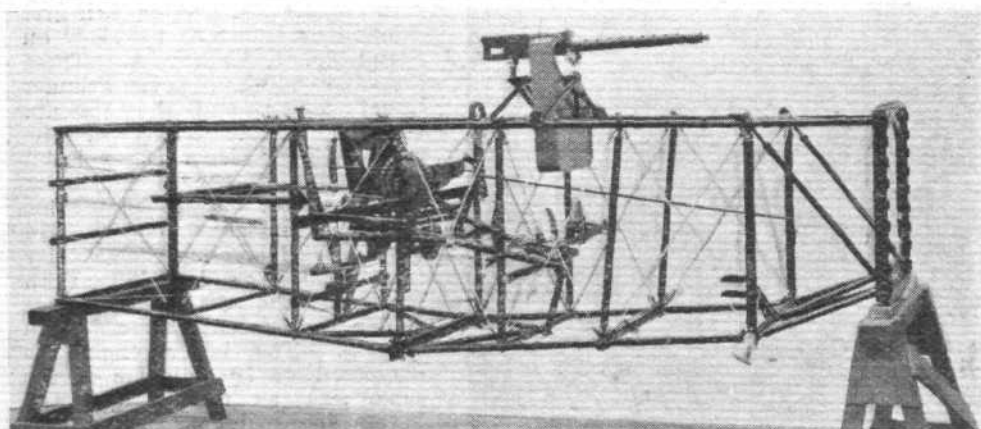
The Armstrong Whitworth Atlas. Under it an Argosy wheel and a model of Argosy. (FLIGHT Photo.)



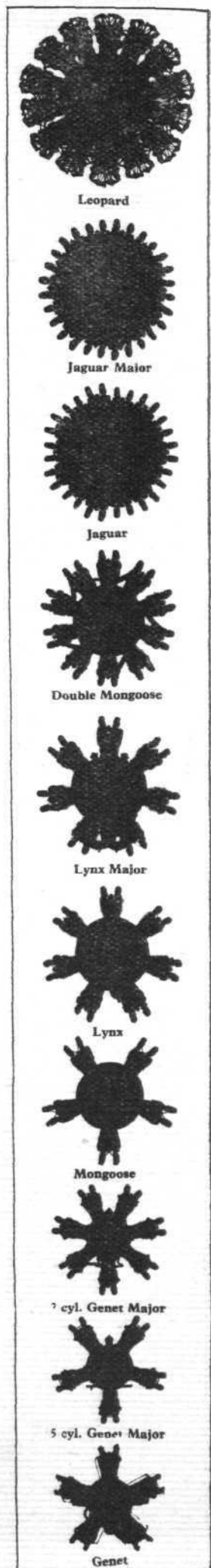
Two views showing a left-hand lower wing of an Atlas (above), and an aileron, both being good examples of the Armstrong-Whitworth steel construction.

fan. By utilising cylinders of the Jaguar size for this Double Mongoose engine and those of the Genet size for the new seven-cylinder Genet Major, a wide range of interchangeability is maintained. Besides these aforementioned engines, Armstrong Siddeley are exhibiting their five-cylinder Genet, Genet Major, Mongoose, seven-cylinder Lynx, 14-cylinder Jaguar, Jaguar Major, and Leopard. This range thus comprises engines varying from 80 to 800 h.p. and utilising 5, 7, 10, and 14 cylinders. Interchangeability has always been sought after by this firm, and the cylinders and many other parts of the five-cylinder Mongoose, the 10-cylinder double Mongoose, the seven-cylinder Lynx, and the 14-cylinder Jaguar are interchangeable in a similar way that they are between the Lynx Major and Jaguar Major, and the five and seven-cylinder Genet Major engines. All the engines except the Lynx Major, Mongoose, five and seven-cylinder Genet Majors, and Genet can be supplied with a simple reduction gear affording a reduction of approximately 0.65 to 1. The Jaguar Major, Jaguar, and Lynx can be fitted, if desired, with the Armstrong Siddeley supercharger, and, in addition, a geared fan giving a partial supercharge at comparatively low altitudes has been developed, and is available for the Jaguar Major and the Lynx Major. The manufacture of the whole range of engines, including many specially patented features, among which may be noted the extremely simple and efficient method of attaching the cylinder to the crank-case by screwing it into an adaptor in the case and wedging it by a clamping ring, and a single screw thus forming a light and simple adjustment which distributes the explosion pressure equally round the mouth of the crank-case, instead of localising it at a few points. A mixing fan is also incorporated in the induction system, and the lubricating oil is passed through a jacket in the consumption chamber, thus both cooling the oil and heating the mixture.

The Armstrong - Siddeley range of engines is here shown in silhouette, arranged so that the relative drag caused by each engine may easily be gauged.



A skeleton fuselage showing Armstrong-Whitworth constructional methods.



BOULTON AND PAUL

The Boulton and Paul Exhibit

THE Boulton and Paul Townend ring is exhibited on a Bristol "Jupiter" engine. The ring is in the form of a regular polygon, the angles of which are in line with the cylinder heads. This shape of ring has the very great manufacturing advantage that it can be, and is, composed of a number of standardised identical parts. A circular ring would entail either panel beating or dies for pressing the parts out of flat sheet. The material used is mild steel, and the sides of the polygon are joined together by welding. The leading edge is also welded, and the section of the ring is a biconvex, although not quite a symmetrical one. The short

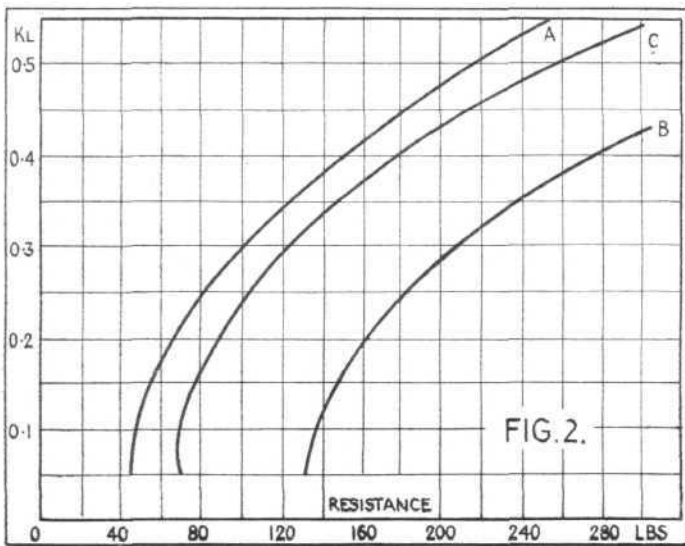
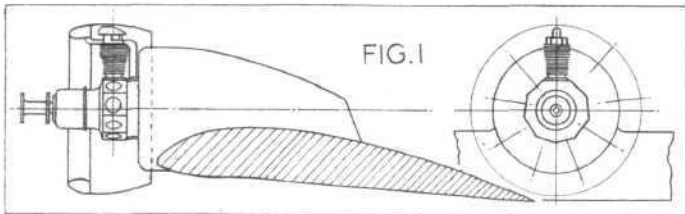
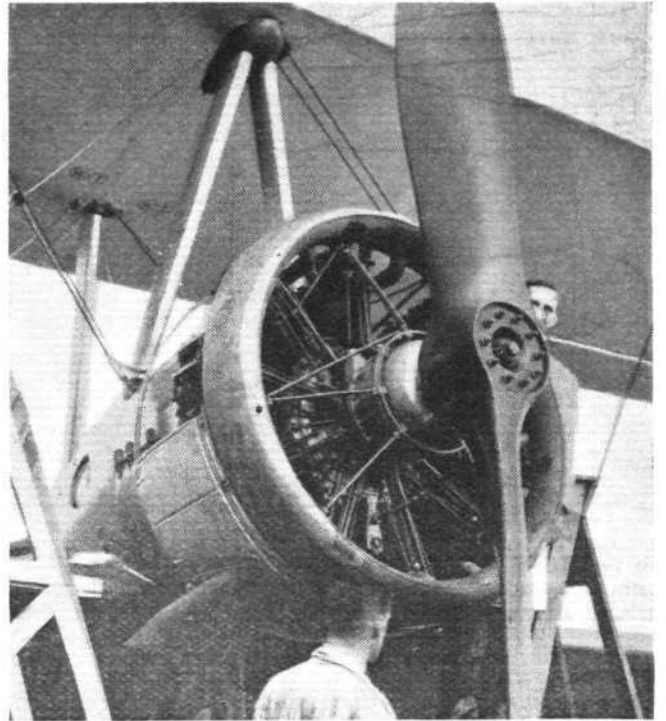


Fig. 2 shows the results of tests on a one-fifth scale model of Jupiter engine, nacelle, and wing. (Fig. 1). The results given are the full-scale drag at 100 ft./sec. plotted against KL of wing. A = wing alone; B = wing with engine and nacelle, no ring; C = wing, engine nacelle, and Boulton and Paul Townend exhaust ring.

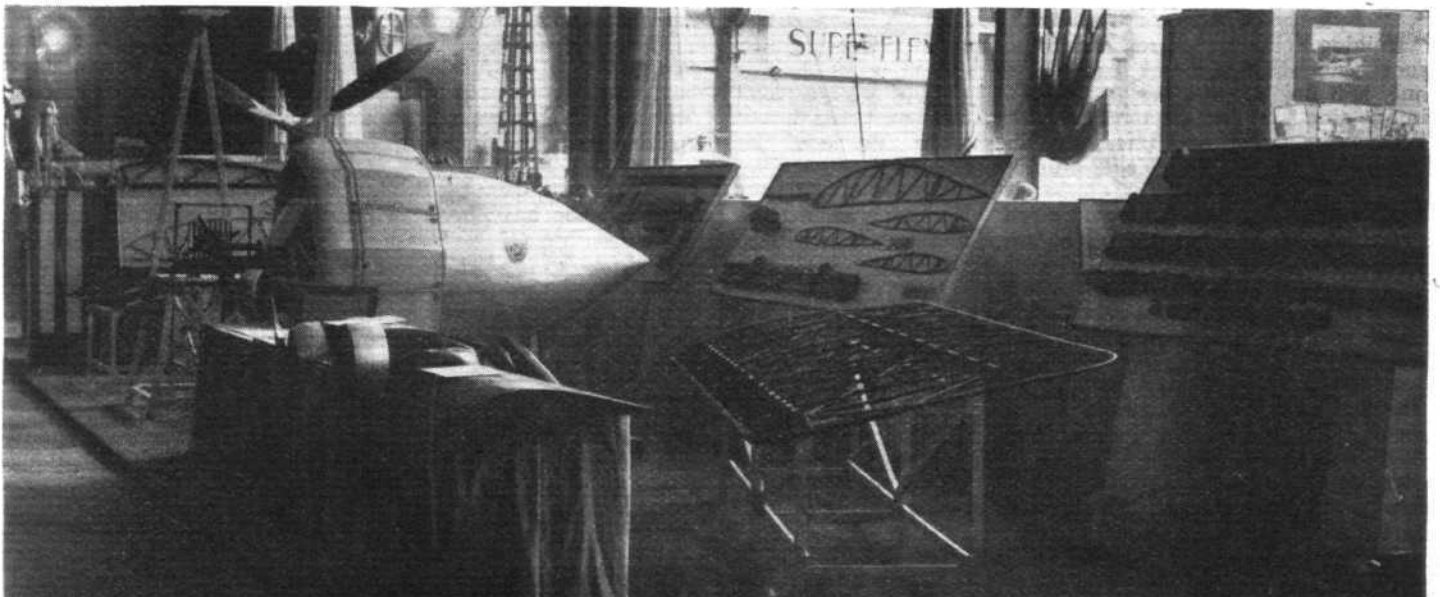


The Boulton and Paul Townend exhaust ring is here shown around a Jupiter engine; some cowling panels behind the ring are removed, showing access to engine.

exhaust pipes are of the telescopic type, so that not only does assembly become a less exacting business but expansion, due to heating up, is taken care of. Incidentally, the Townend ring, when used as an exhaust collector, is a very effective silencer. So much so that the "Sidestrand," fitted with this type of ring, cannot be heard when some 500 ft. away. And the air flow is such that the ring keeps remarkably cool. Only in one place, between the two exhaust pipe outlets, does the ring ever get red hot.

A demonstration model of the Townend ring shows the negative drag by the ring, which is suspended around a model engine and supported on cords, blowing forward into the wind as soon as the electric fan is started.

In addition to the exhibits of their normal spar sections, etc., Boulton and Paul show several new structure members which have not, as far as we are aware, been seen before.



On the Boulton and Paul stand. The skeleton wing is for a Blackburn Bluebird. The models in the foreground are for wind-tunnel research on the Townend ring, which may be seen in the background fitted to a Jupiter engine. (FLIGHT Photo.)

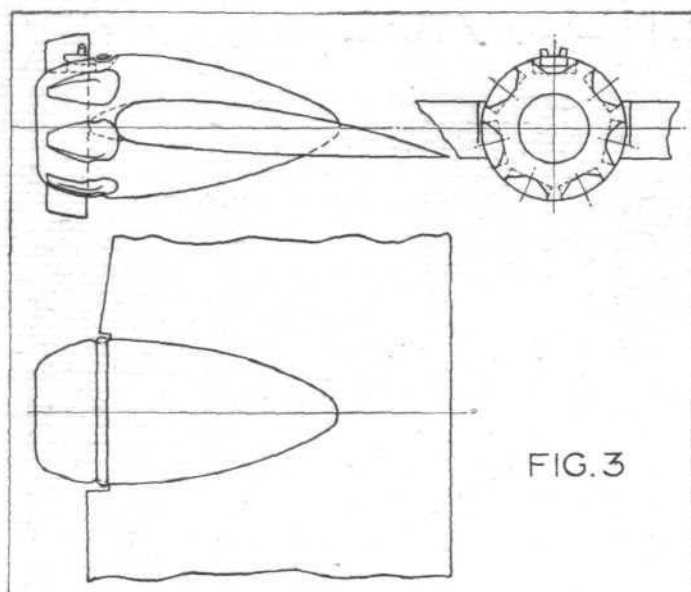


FIG. 3

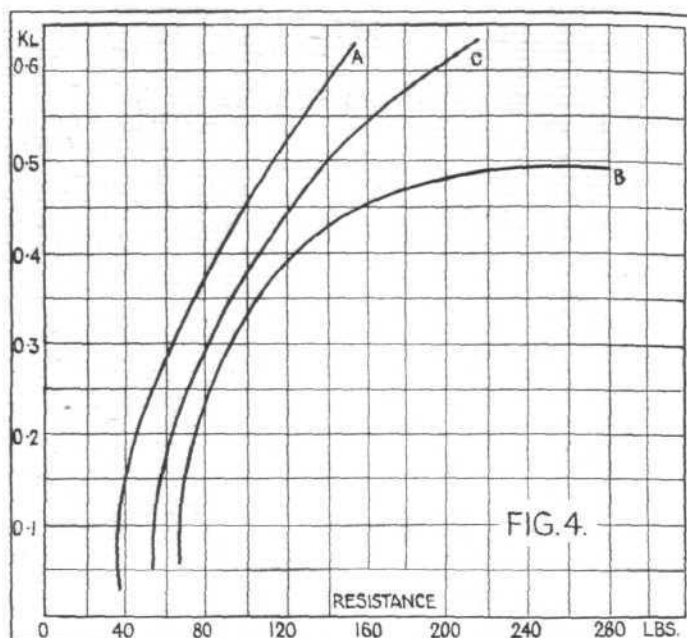


FIG. 4.

The result of tests on wing nacelle for Lynx engine, quarter-scale model (Fig. 3). In Fig. 4, A = drag of wing alone, B = wing nacelle and engine unringed (note serious interference at high incidence causing premature stalling of wing), C = wing nacelle and Boulton and Paul Townsend ring; the interference is reduced and the maximum K_L is restored.

These include a complete steel wing for a Blackburn Bluebird, in which use is made of a modified form of the spar section known as the "double eight." In the Boulton and Paul spar the middle corrugation is less deep than the outer two lobes. The wing ribs are also of steel, and no riveting whatever is used in their construction, the web ties being joined to the flanges, between the lips of which they are pinched, by electric spot welding. This form of construction looks extremely neat and simple, and is not, of course, confined to small ribs such as those used in the Bluebird wing. A length of wing spar suitable for sizes up to quite large aircraft is also shown. This spar is a new type, and consists of two booms approximately of circular section, with curled-over lips projecting inwards towards the centre of the spar. The spar web is a plain steel strip, and obviously can be of whatever width is necessary to give the desired spar depth. The flat web is attached to the two tubular booms by large-

diameter tubular eyelets, spaced some $1\frac{1}{4}$ in. apart. For quick production of spars this form of construction should be excellent.

Another new Boulton and Paul section, not previously shown, is used as struts. This is actually a modification of the well-known Boulton and Paul closed-joint tube, but is formed to a square section instead of the familiar circular section. A portion of steel fuselage using this square-section closed joint tube as struts is exhibited. The longerons which go with these struts are channel sections with curled-over edges. The struts in the side bays pass between the sides of the channel, while the top and bottom bay struts are attached to the sides of the channel longerons by plain channel section fittings and bolts. One would have thought that longerons with one side open would not be very stable, but presumably they are steadied a good deal by the side panel struts.

THE BRISTOL AIRCRAFT

The Bristol Aircraft Exhibit

ALTHOUGH, like nearly all the British exhibits, the Bristol stand is under the gallery, there are always plenty of visitors who find their way to the little "Bulldog" staged there. And the machine is shown in such a way that it is not readily passed by unnoticed. Not only is it finished in a very attractive style, but a large panel in one side has been removed, and the structure beneath can be examined without difficulty. The colour scheme of the "Bulldog," as exhibited is all-aluminium, even to the engine cylinders, exhaust collector, etc., and the only touch of colour is the pale blue back of the fuselage. The general effect is extremely pleasing and attracts large numbers of visitors. The more discerning of these do not rest content with a brief glance at what is undoubtedly a very pretty little machine, but take the opportunity to examine the internal structure, which is finished in black enamel. If one watches the stream of visitors it is discovered that quite a large percentage are attracted by the layout of the equipment. The modern British single-seater fighter is a maze of instruments, levers, handles, and apparatus of all sorts, and the way in which the arrangement of all this equipment has been planned in the "Bulldog" is generally admired. No space is wasted anywhere, yet there is no sense of cramping or lack of elbow room.

Those whose interest lies rather with the structural side of aircraft than with its military fitness for its work find much besides the "Bulldog" to interest them on the Bristol stand. A complete left-hand bottom wing of a "Bulldog" is shown in skeleton, and illustrates the type of metal construction which the Bristol Company has developed during the last three or four years. A small wing rib of steel construction is

exhibited in a vibration testing machine, while a larger rib is shown in a very complete jig for testing the rib in bending under distributed load, the sort of load distribution met with in actual flying being simulated in the machine.

The type of construction (crinkled steel strip) used in the rear portion of the fuselage is illustrated by a complete fuselage bay, and large boards hold a selection of rolled steel sections, such as wing spars, rib flanges, large-diameter tubes made up from strip, the final form being polygonal, and many other sections. Lengths of steel strip show various stages in the rolling process, from the original flat strip to the final section.

Those who have had the privilege to follow fairly closely the experimental work done by the metal construction department of the Bristol Company during the last year or two will know that a great deal of work has been carried out on large monoplane wings. A length of spar of N girder formation is shown, which is very simple and yet is reported to be very efficient. It is in the form of top and bottom booms, joined by vertical and diagonal web members forming a series of "N's." Duralumin planking or skin with shallow corrugations placed fairly far apart is used with this type of spar, and the specimen spar has a short length of planking attached to show the construction.

Altogether, the Bristol stand is well worth a visit.

The Bristol Engine Exhibit

If the Bristol aircraft stand attracts attention, the Bristol engine stand, in another part of the Grand Palais, is even more crowded, not only because it is on the ground floor and adjoins one of the gangways, but even more on account of a very beautifully finished "Jupiter" engine which is shown partly sectioned and running. The facility

with which the working of the various parts can be followed ensures a constant crowd of interested onlookers, among whom only those familiar with Bristol engine manufacture know that the very high finish of the actual internal parts is the standard and not merely a "show finish."

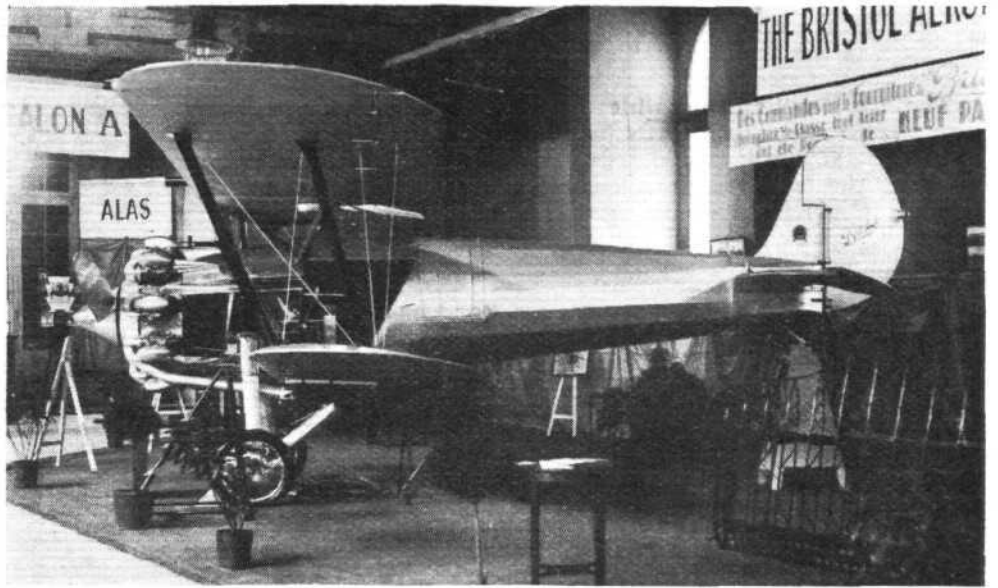
Those who look a little more deeply into the technical aspect are inevitably drawn to the other two Bristol engines shown: The two "Mercurys." Both of these are geared engines, with a gear ratio of 1.52 to 1. One is the type IV A and the other the type V A. The IV A is rated at 520 b.h.p., at 4,400 m. (14,500 ft.), and weighs 430 kg. (945 lb.), while the type V A is rated at 550 b.h.p. at 4,000 m. (13,000 ft.) and weighs 450 kg. (995 lb.). Both these models of the 1931 "Mercury" are high altitude service types, with a compression ratio of 5.3 to 1 and supercharged. The type IV A "Mercury" has a normal speed (at the rated altitude of 13,000 ft.) of 2,250 r.p.m., when it develops 490 b.h.p. The maximum speed at that height is 2,450 r.p.m. at which speed the power developed is 520 b.h.p.

The "Mercury" V A has normal engine speed of 2,000 r.p.m., and its rated altitude is 11,000 ft. At that height, and at normal revolutions, the power is 525 b.h.p., while at maximum revs. (2,200 r.p.m.) the power is 550 b.h.p.

At normal r.p.m. the "Mercury IV A" has a fuel consumption of 38 gallons per hour, and the V A consumes 41 gallons per hour. At average cruising speed the consumption of the IV A is 22 gallons per hour, and that of the V A 23 gallons per hour. The average cruising consumption of oil is 7 pints per hour for both models.

The introduction of the "Mercury" series of engines (there are, in addition to the two models shown, the V B service type and the VI A, VI B, VII A, VII B, VIII A, and VIII B, general purpose and commercial types) does not mean that the "F" type "Jupiter" will be discontinued, but the intention is that as and when new types of aircraft are produced they should be fitted with the "Mercury" series, the back cover layout and method of mounting being so different from those of the "F" type that they are not interchangeable with the standard "Jupiter" types.

Of interest to aircraft designers are such features of improvement as the provision of gas starting together with inertia starter of either the hand operated or electrically



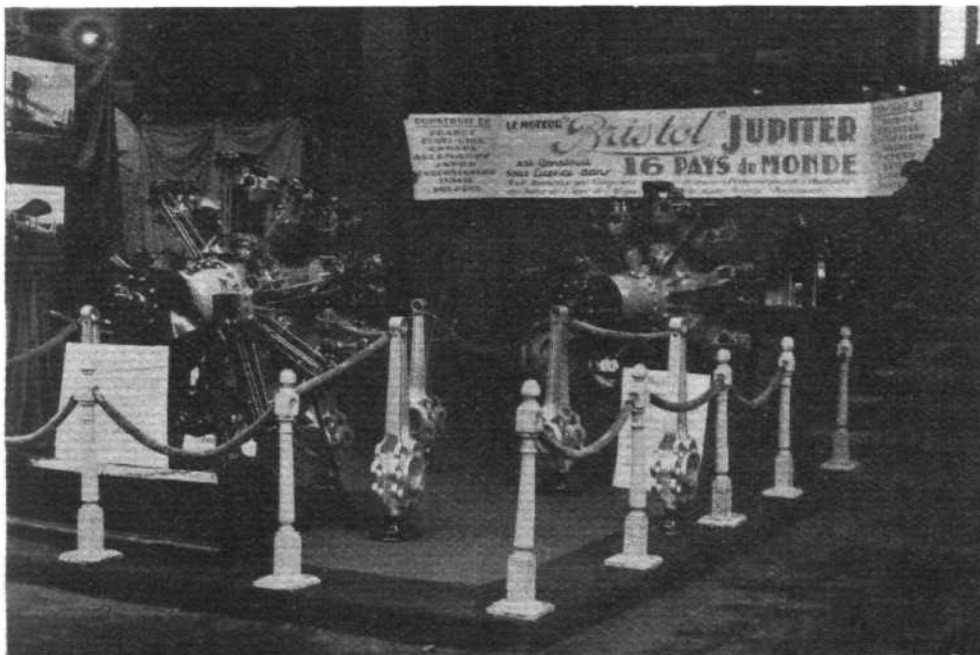
The Bristol "Bulldog" is exhibited with panels removed to show the structure and equipment. (FLIGHT Photo.)

driven type, engine-driven petrol pump unit with built-in relief valve, twin unit gun interrupter gear, at the back of the engine, automatic ignition control to the magnetos, and automatic boost control. In addition, subsidiary drives are provided for oil centrifuger, electric generator unit, and other equipment such as telemeter, etc.

As it was impossible to incorporate all these auxiliary components and drives on the standard Jupiter type of back cover, the attachment of the engine to the aircraft has been entirely altered and the "Mercury" engines will be provided with a conical mounting, secured to the aircraft by 18 bolts, incorporating rubber buffer shock-absorbing fittings.

It should also be mentioned that in the "Mercury" series of engines a much lighter reduction gear has been provided, while the reduction gear casing is a forging. In this way a saving in weight of about 40 lb. has been effected. The "Mercury" has now passed successfully the British Air Ministry's 100 hours type test, and orders for the engines can therefore be placed with every confidence.

In addition to the complete engines, the exhibits on the Bristol engine stand include a "Triplex" carburettor with the automatic boost control used on the "Mercury" engines, a gas starter, a reduction gear, cylinder heads in various stages of manufacture, and a number of finished engine components, such as crankshafts, pistons, valves, etc.



The Bristol Engine stand. The sectioned "Jupiter" is on the left and the two "Mercury" engines on the right and in the background. (FLIGHT Photo.)

DE HAVILLAND

The De Havilland Exhibit

ALTHOUGH they have no stand of their own at the Show, the De Havilland Aircraft Co., Ltd., have managed things very well by exhibiting on the stand of Morane-Saulnier, who hold the French licence for building Gipsy Moths, a Puss Moth with Gipsy III engine. This machine, painted yellow and carrying the registration letters G-ABFY, is by way of being a travelling show for quite a section of the British aircraft industry. In addition to its usual standard equipment, such as Smith's instrument board, etc., the machine is shown fitted with Dunlop "doughnuts" and Bendix brakes, Handley Page automatic wing tip slots, and a Brown turn indicator. A neat transfer testifies to the fact that the very nice finish is obtained by the use of Titanine dope. Captain Broad is kept busy dealing with inquiries, and seems to have fallen into his new rôle of salesman as if to the manner born. And, of course, when the potential purchaser walks on to the stand and begins to ask questions, he finds he is talking to a salesman who can tell him absolutely all there is to know about the machine. What this alone is worth to the manufacturers cannot easily



The Puss Moth is a centre of attraction on the Morane-Saulnier stand.
(FLIGHT Photo.)

be estimated, but it must be a very great advantage indeed, and the excellent sales and publicity organisations of the De Havilland Company have paved the way, so that it is not in the least surprising to find that quite a brisk business is being done by the stranger on the M.-S. stand.

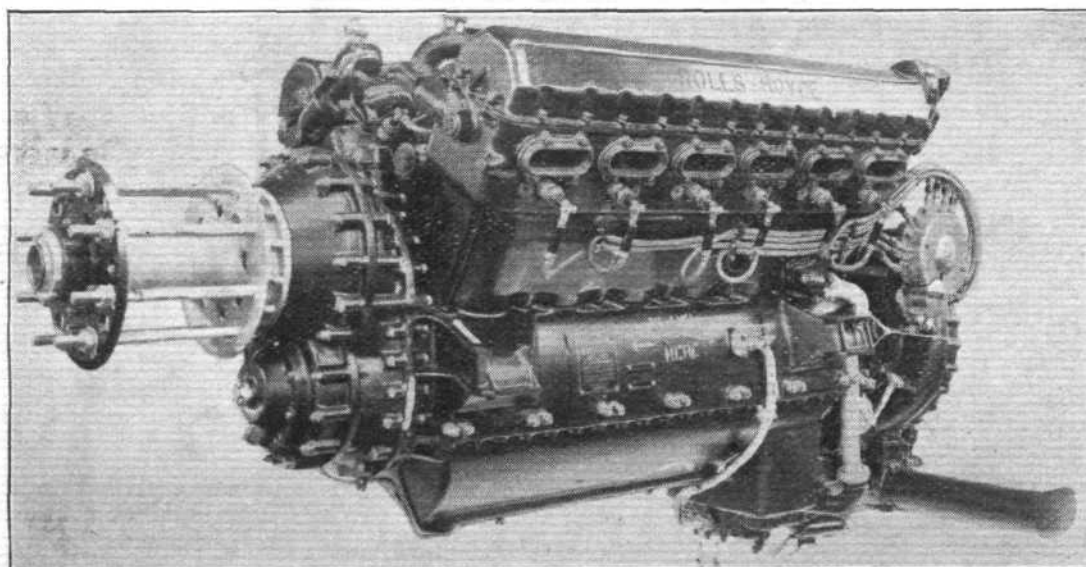
ROLLS-ROYCE

The Rolls-Royce Exhibit

QUALITY, rather than quantity, is the key note on the Rolls-Royce stand, but three engines being exhibited. These are an H type, an F type naturally aspirated engine, and an F-type supercharged engine. Between them, these three engines really are representative of Rolls-Royce products, since the H type represents the most powerful unit, while of the other two, the F type normal represents both the FA of 6:1 compression ratio, and the FB type, with 7:1 ratio, while the supercharged engine represents the moderately supercharged (MS) type, and the fully supercharged (S) type. Needless to say, the engines look

remarkably well, although they are shown in standard, and not in show finish. It is probably not generally realised that the "F"-type engine is supplied in no less than 12 varieties, all incorporating the same main components. The 12 varieties are obtained by supplying the engine with three different propeller-reduction gear ratios, two different compression ratios, natural aspiration, and two degrees of supercharging.

The three propeller-reduction gear ratios standardised for the Rolls-Royce "F"-type engines are 0.632:1; 0.552:1; and 0.475:1. The two compression ratios standardised are 6:1 and 7:1, with normal aspiration. The two



The Rolls-Royce type "F" Supercharged engine.



The Rolls-Royce stand. On the right the "H" type engine, on the left the "F" type, and in the background the supercharged "F" type. (FLIGHT Photo.)

degrees of supercharging are known by the letters MS, or moderate supercharging, and S, or full supercharging. The former maintains ground-level power up to 3,000 ft., and permits of a certain amount of supercharging at take-off, while the fully supercharged model maintains ground-level rated power up to 11,500 ft. In connection with the high-compression engines, the rated output of 480 h.p. is developed at normal speed at ground level, and maintained to an altitude of 3,000 ft. by opening the throttle to the fullest extent.

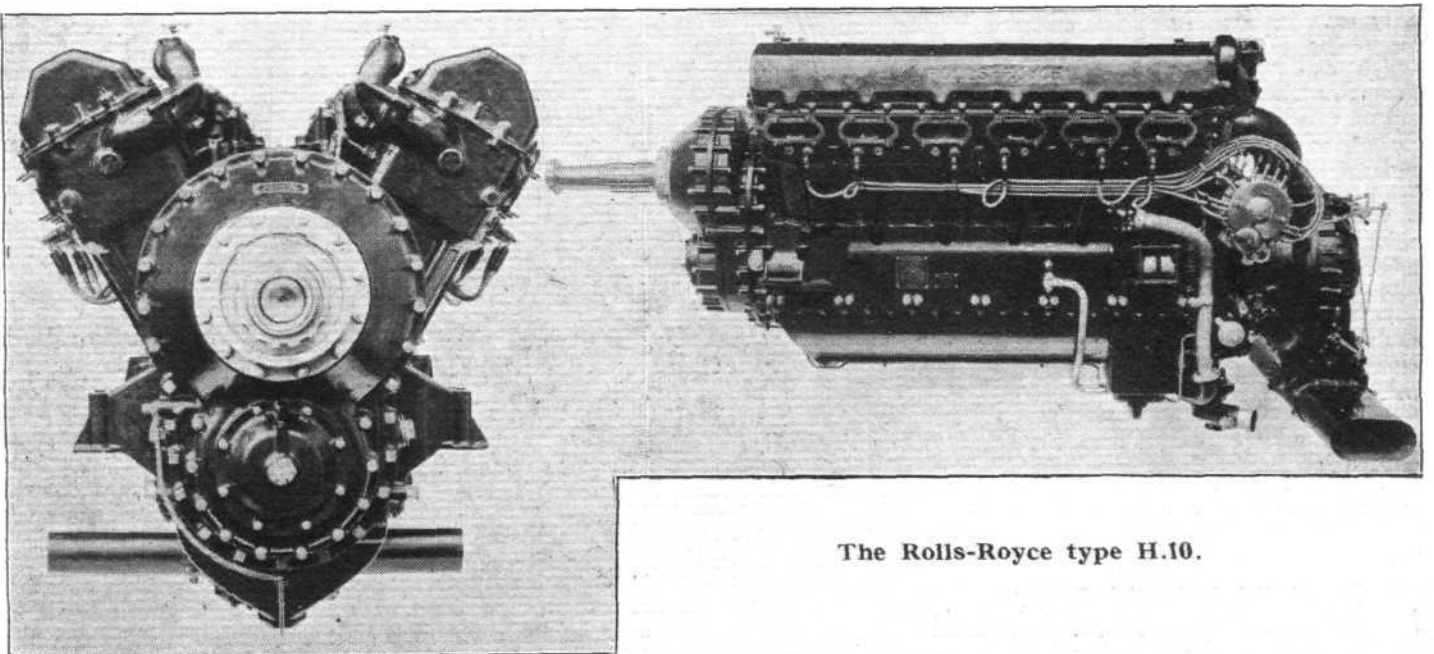
As some considerable confusion appears to exist concerning the various Rolls-Royce "F"-type engines, it may be of service if we point out here that the Roman figures which follow the type letter represent the gear ratios, as follows:—XI indicates a reduction gear ratio of 0.632 : 1; XII indicates a gear ratio of 0.552 : 1; and XIV a gear ratio of 0.475 : 1. In the various types it will be found that the Roman figures are followed by letters, such as A, B, MS, or S. Here A indicates a compression ratio of 6 : 1; B a compression ratio of 7 : 1; MS indicates moderate supercharging, and S full supercharging.

The 6 : 1 compression ratio "F" engine is rated at 490 normal brake horse-power at ground level, and has a fuel consumption of 31 gallons per hour at normal power and revolutions per minute. The 7 : 1 compression ratio engine is rated at 480 b.h.p. at ground level, and has a consumption

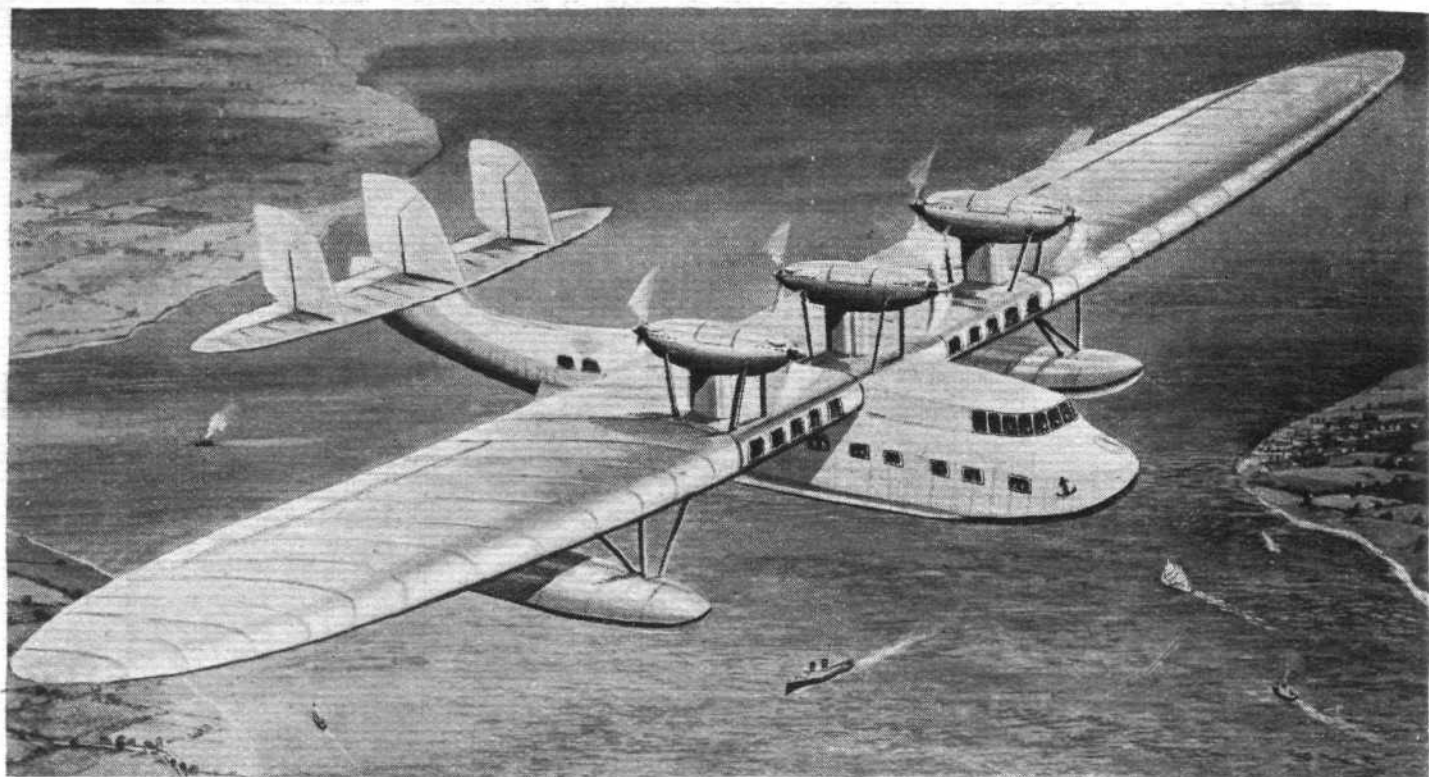
at normal power and revolutions per minute of 28 gallons per hour. The moderately supercharged models are rated at 500 b.h.p. at 3,000 ft., and have a consumption of 35 gallons per hour, while the fully supercharged models are rated at 480 b.h.p. at 11,500 ft., and have a consumption of 32 gallons per hour.

The Rolls-Royce "H"-type engine is larger and more powerful than the "F" type, but is generally similar to it. It is fitted with a supercharger which can be fully used at ground level, which helps materially in getting a heavily-loaded aircraft off. Two different propeller gear ratios are provided, *i.e.*, 0.553 : 1, and 0.477 : 1. These varieties are known as the H XII MS, and H XIV MS, respectively, the letters MS indicating, as in the case of the "F" type, moderate supercharging.

As a description and data relating to the Rolls-Royce engines were published in our issue of November 21, 1930 (the special British Aircraft Industry Number), it is not thought to be necessary to repeat that information here, but it is hoped that the brief explanation given above of the significance of the series numbers and letters denoting the various varieties of "F" engines will be of assistance in enabling our readers to know the exact meaning when they see the statement that a machine is fitted with a Rolls-Royce F XII MS engine, for example.



The Rolls-Royce type H.10.



An artist's conception of the Supermarine Monoplane Flying-Boat (six Rolls-Royce "H" engines).

VICKERS - SUPERMARINE

The Vickers Supermarine Exhibit

QUITE a new note in stand design has been struck by the Vickers-Supermarine firms. It was found impossible to find stand space for all the various types that could have been exhibited, and it was therefore decided to show models. These, by themselves, however, are not always very convincing, and so a series of transparencies was produced as well. A system of case construction has been evolved whereby, in an extraordinarily neat manner, the outer cases serve as the main basis, which can be arranged in dozens of different ways, on top of which are placed the boxes with the transparencies, and on top of them again the models. The general effect is very good indeed, and the collection already got together will doubtless be extended and amended from time to time. Transparencies and models of the following Vickers' machines are exhibited: "Jockey" interceptor fighter, "Vellore" freight carrier, "Vildebeest" (as landplane and seaplane), Vistra 3-engined and 2-engined commercial machines and Vespa Army-Co-operation machine. Supermarines are represented by models and transparencies of Southampton, Sea Hawk, S6 Schneider Trophy winner and holder of world's speed record, and of the new, large 6-engined flying-boat now being built at Southampton.

In the centre of the show of models is a case with numerous Vickers' accessories, while two cinematograph projectors

SUPERMARINE MONOPLANE FLYING-BOAT 6, Rolls-Royce "H"

General Dimensions:

Span	..	174 ft.	53.03 m.
Root Chord	..	29.5 ft.	8.99 m.
Wing area	..	4,000 sq. ft.	371.60 m. ²
Overall length	..	107 ft.	32.68 m.
Overall height	..	32 ft.	9.75 m.
Petrol tankage	..	2,250 gall.	10 228.40 litres.

Constituent Weights (approximate)—

I. Endurance for 6 hours.

Tare weight	..	50,650 lb.	22 974.43 kg.
Petrol	..	8,360 lb.	3 792.03 kg.
Oil	..	600 lb.	272.15 kg.
Paying load	..	16,000 lb.	7 257.40 kg.
		75,610 lb.	34 296.01 kg.

II. Endurance for 12 hours.

Tare weight	..	50,650 lb.	22 974.43 kg.
Petrol	..	16,590 lb.	7 525.02 kg.
Oil	..	1,050 lb.	476.27 kg.
Paying load	..	6,800 lb.	3 084.42 kg.
		75,090 lb.	34 060.24 kg.

Weight per sq. ft. of wing

area	..	18.75 lb.	91.54 kg./m. ²
Weight per h.p.	..	13.9 lb.	6.29 kg.

The following figures are deduced from wind tunnel tests:—

Max. speed—sea level	..	145 m.p.h.	233.35 km./h.
Landing speed	..	72.5 m.p.h.	116.68 km./h.
Rate of climb—sea level	..	750 ft./min.	3.81 m./sec.
Service ceiling	..	11,000 ft.	3 352.80 m.
Normal range	..	700 miles.	1 126.54 km.
Max. range	..	1,300 miles.	2 092.15 km.

illustrate the activities of the Vickers and Supermarine firms.

Most of the machines of which models are exhibited will be familiar to readers of FLIGHT, but the new 6-engined flying-boat is still a thing of the future, and a few notes about it may, therefore, be of interest.

This flying-boat will be one of the largest ever built in Great Britain. The transparency exhibited at the Show gives a clear idea both of the construction and the internal accommodation, and there is no doubt that when completed it will be a very great advance in large flying boats. The power plant consists of six 900 h.p. Rolls-Royce type "H" engines, an installation which constitutes the largest power yet installed in any British aircraft. The engines, as will be seen from the sketch, are mounted in pairs back-to-back above the wing, a position which places them out of harm's way and should eliminate all interference from spray, particularly when taxiing in bad weather. Luxurious internal accommodation will be provided for 40 passengers, and de-

tachable bunks are arranged so that, when necessary, sleeping accommodation will be available for 20 passengers. The pilots' cabin is situated in an exceptionally high position, which will provide them with an excellent view. Little as yet may be said regarding the constructional methods, but it is already announced that the hull will be built up from stainless steel, while the wing will be constructed from meta-

with the exception of the covering of the trailing portion, which is of fabric. The main spar will be entirely of stainless steel, as will be the nose covering, which two together will form a structure of great torsional rigidity, a feature so essential in a monoplane wing of such large proportions.



On the Vickers - Supermarine Stand. The case in the centre contains Vickers accessories.

(FLIGHT Photo.)

ACCESSORIES

The British Accessories

IN addition to aircraft and engine firms, quite a number of British firms are exhibiting accessories, equipment, etc., on stands in the gallery of the Grand Palais. Imperial Airways, Ltd., have a stand adjoining the Bristol stand, under the gallery, on which are exhibited models of the Armstrong Whitworth "Argosy" and the Handley Page "Hannibal," as well as larger models of the cabins of these two machines. A large and striking tableau shows the growth of passenger, goods and mail traffic with the years, while photographs illustrate the various activities of the company.

The Dunlop company has a large stand in which a huge

illuminated "?" rotates and calls attention to the stand. A full range of wheels is exhibited. The Palmer Tyre Co. shows a full range of aero wheels, from 300 by 60 to 2,000 to 450, and also a demonstration outfit which shows the working and effectiveness of the Palmer aero-wheel brake.

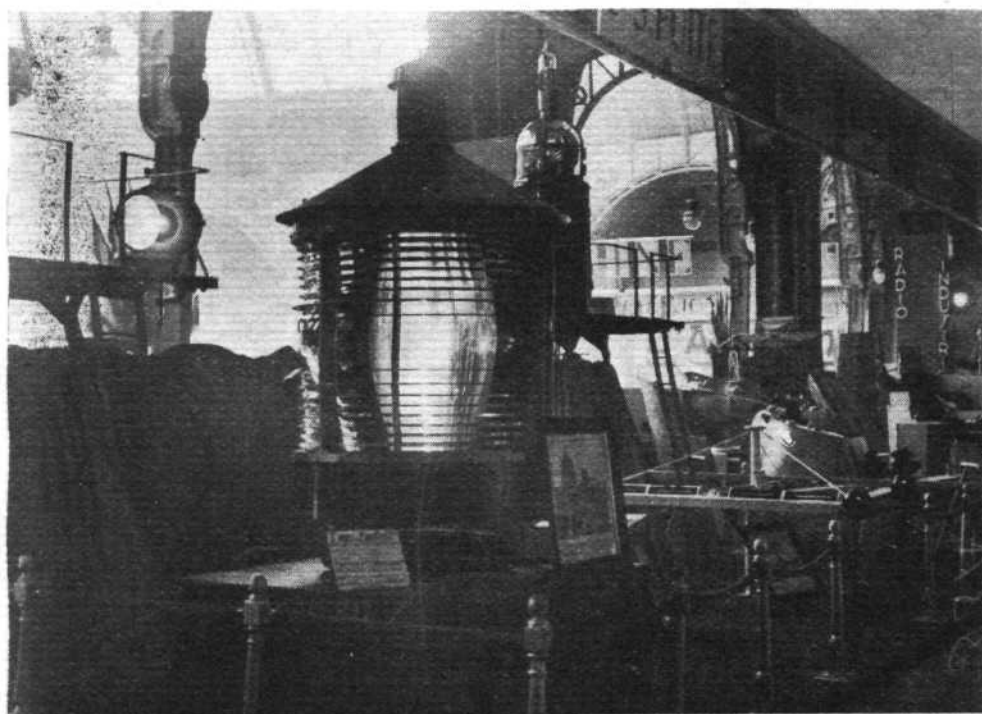
Kirby Smith draws attention to their stand by a signpost bearing the name, and exhibit K.L.G. plugs, Smith's instrument-boards, Husun compasses, and an Armour wind-direction indicator.

On the Lodge stand is shown a complete series of plugs, a sectioned model in "supernatural" size explaining the construction, while a scale model of the Supermarine-Rolls S.6 recalls the fact that the Schneider Trophy Contest of 1929 was won with the assistance of Lodge plugs.

Arens Controls were smart enough to secure a stand at the eleventh hour, and show the very excellent non-backlash type of controls for which the firm is becoming famous. Superflexit exhibit specimens of their well-known flexible tubing.

Chance Brothers have a large and very attractive stand with numerous aerodrome-lighting equipment.

We have in FLIGHT already described a test which was carried out with the Chance portable flood-light at the Heston Aerodrome, since which time interest in this type of equipment has increased to a great extent. Another exhibit is the illuminated wind indicator. Two types of Boundary lights are also made, and the one shown is so designed that it has a spring section in the base allowing it to be folded down, and thereby avoiding damage should an aircraft run into it. A portable acetylene obstruction light is also shown, and a 12-in. ceiling light with a clinometer for measuring the height of the clouds is demonstrated. Two types of airway beacons are also on view, the larger of which has a diameter



Chance Brothers' stand in the gallery exhibits a very complete series of aerodrome-lighting equipment. (FLIGHT Photo.)

of 500 mm. and is of the fourth order. Models of other forms of landing floodlights of the fixed and revolving type are also shown, and by way of showing the public that Chance Bros. were lighting the coasts over 60 years ago, there is a unique working model of the Eddystone Lighthouse.



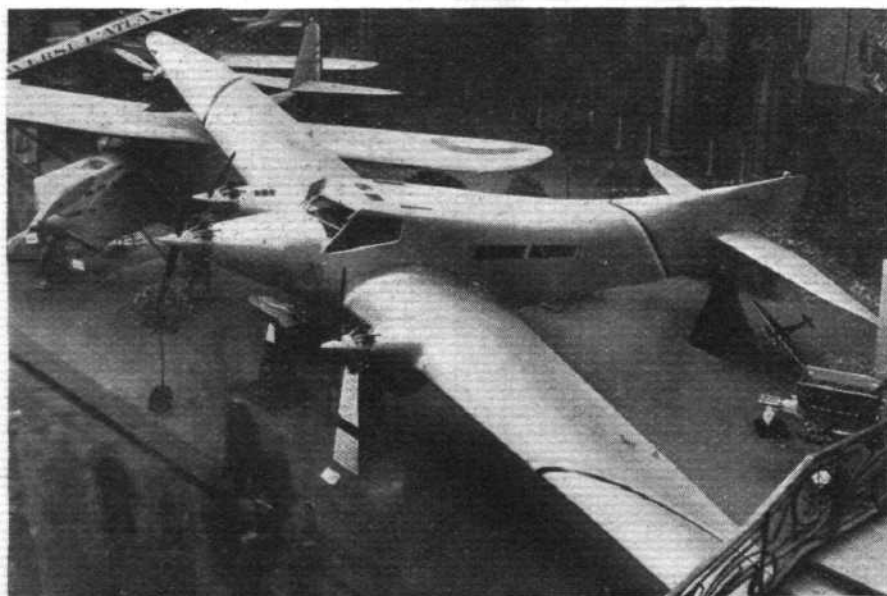
Although secured at the last moment, the Arens Control stand is very effective and has much of interest. (FLIGHT Photo.)

The Continental Sections

SPACE does not, unfortunately, allow us including more than this survey of the British exhibits, this week. Next week we shall deal with the French, German, Dutch, Italian and Polish sections. The French section is far and away the largest, and although several firms are not exhibiting, it still gives the impression of being larger than ever. This is no doubt due to the preponderance of large machines, rather than to a superiority in numbers. The French firms exhibiting are:—Bernard, Blériot, Bréguet, C.A.M.S., Caudron, Couzinet, Dewoitine, Farman, Hanriot, Latécoère, Levasseur, Loire et Olivier, Morane-Saulnier, Mureaux, Nieuport-Astra, Potez, Schreck, F.B.A., S.E.C.M., S.P.C.A., and Weymann Wibault. Germany is represented by a Dornier Do. S., a B.F.W., a Junkers "Junior," and a series of models from Klemm, Rohrbach, Heinkel, and Focke-Wulf. Holland is represented by Fokker, Italy shows types from the Fiat factory, and Poland some from the International Aircraft Establishment of Warsaw.



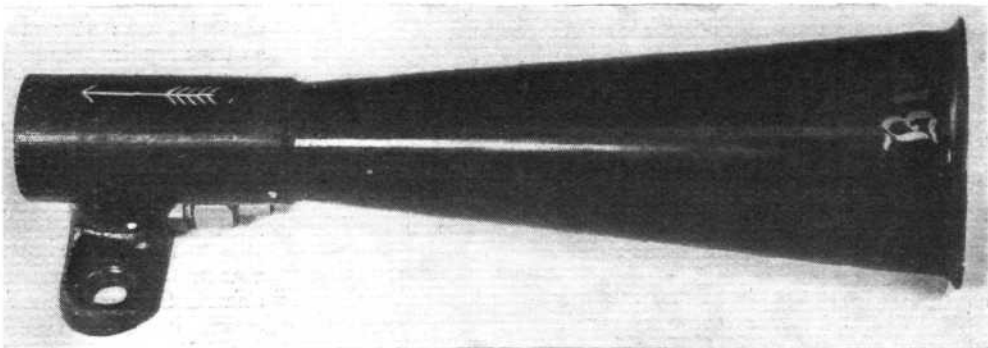
The Blériot 125 is a twin-fuselage 12-seater monoplane with two water-cooled engines in tandem. The pilot's cabin is between the engines. (FLIGHT Photo.)



The Couzinet type 20, has three Salmson 40-h.p. engines and a retractable undercarriage. Note the very pointed engine cowlings. (FLIGHT Photo.)

THE BROWN AERO TURN INDICATOR

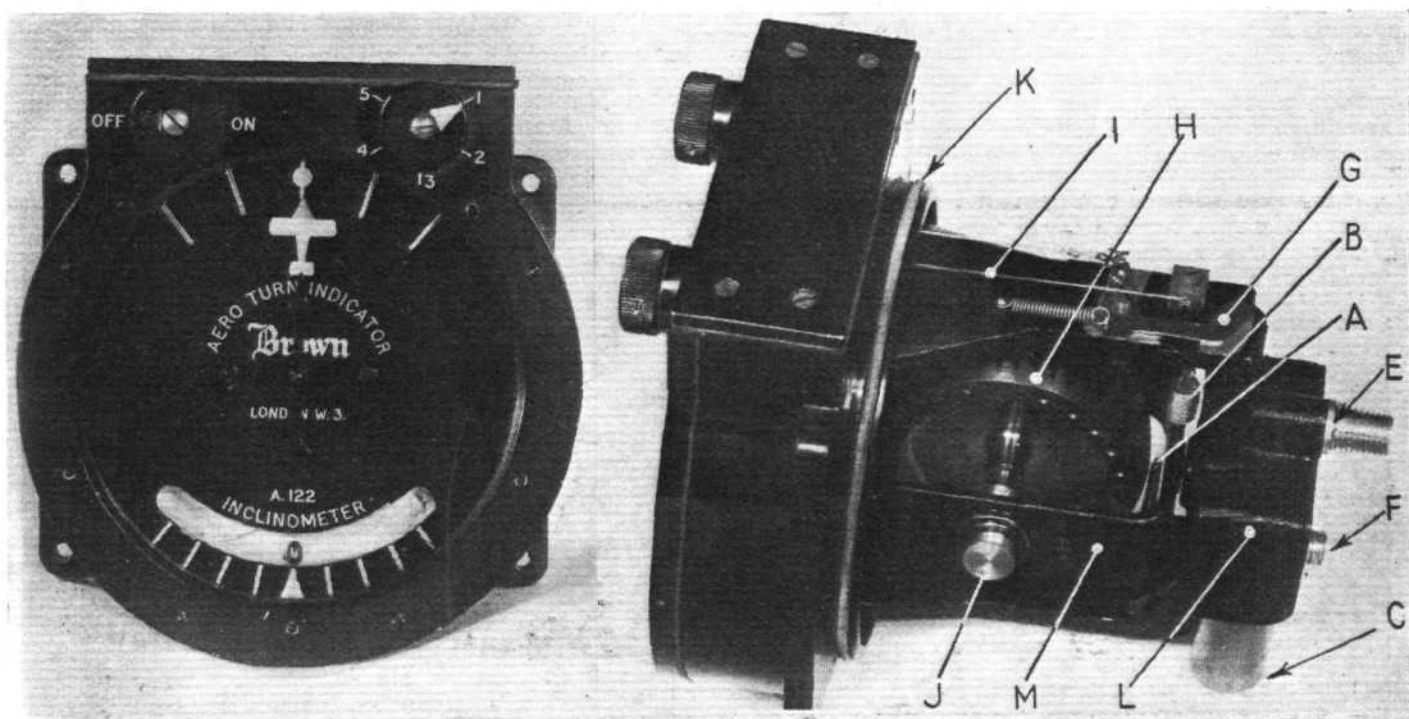
AN instrument recently placed on the market of the type which has long been upheld as a desirability by those whose flying carries them through cloud is an Aero Turn Indicator, made by S. G. Brown Ltd., North Acton, London, W.3. This is made in two forms, the first, driven by air and the second electrically; in size and weight they are identical, the latter being 1 lb. 7 oz. This type of instrument is undoubtedly a very great help when flying in cloud and particularly so for cabin machines. Whether or not a plain turn indicator justifies its expense or not is a highly controversial point, but S. G. Brown have to large extent already anticipated this point by designing a Pitch and Yaw indicator, the use of which should greatly assist the average pilot to keep his machine on a steady level path when forced to fly "blind." This latter instrument, however, is still only in the experimental stage and is at present being tested at Farnborough. The two types of Turn Indicator at present on the market have the same method of operation in each case, which consists of a small gyroscope rotating at approximately 4,000 r.p.m. The ordinary action of a gyroscope is too well-known to require detailed description, but a short description of the detailed points of construction may be interesting. With the air-driven model a venturi head is supplied, made of aluminium, which is quite small and neat, and the casing of the instrument is, of course, air-tight. The inlet of the casing, which is gauze covered, is in the form of a small jet through which air impinges on a series of peripheral serrations or cups on the rotor, thus driving it at the correct speed. The frame, or gymbal ring, carrying the rotor has its motion damped by carrying on its extremity two arms operating small cylindrical dash-pots; these dash-pots are totally enclosed and thus free from dust and all parts of the arms and pistons and the pots themselves are made from rustless metal. They are solely, air dash-pots, and there is, therefore, no lubrication to require attention, and being totally enclosed there can be no trouble from dust. Further control of the horizontal frame is a small spring on one side of its fore and aft axis, the tension of which may be varied by the pilot through the medium of a small knob on the face of the instrument, thereby giving a range of sensitivity which should



The Brown aluminium venturi head.

(FLIGHT Photo.)

make the instrument suitable for all types of machines or all weathers. The dash-pot damping makes the gyroscope absolutely "dead beat" and there is no overswing in either direction. The electrically-driven model is similar in all essential details, except that the rotor is driven from a 12-volt direct-current supply, and the indicating face is electrically illuminated, so that red or green windows are exposed according to which way the turn is being made. Apart from this form of illumination the dials of both instruments are also luminised. In both cases a small inclinometer is included at the bottom of the dial, which really transforms the instrument into a bank and turn indicator. The electrical model only consumes 0.5 amp. and experiments are being made to reduce this even further, as 0.4 of this is required by the lamp and only 0.1 to operate the gyroscope. An on and off switch is provided for both the air-driven and electrically-driven models, and in the case of the latter there is a dimming position of the switch for the internal illumination. At present the instrument is arranged for dash-board mounting and measures approximately 4 in. in all directions, so that it is particularly neat and should offer no great difficulty of installation in the average privately-owned aircraft. In most electrically-driven turn indicators, which have so far been offered to the public, there has been one great draw-back to their use, and this has been their effect upon the magnetic compass. S. G. Brown, however, have utilised a patented form of rotor winding which entirely does away with this difficulty, and the indicator may be placed as close to the compass as is possible and at any position with regard to it without having the slightest effect upon it.



Front and side views of the Turn Indicator, showing A the jet, B the damping spring, C the dashpots, E venturi connection, F inlet to jet, G cut-off valve to venturi, H rotor, I thread controlling sensitivity spring, J covered rotor bearing, K airtight casing joint, L airtight dashpot cover, M gymbal ring. (FLIGHT Photo.)

AIRISMS FROM THE FOUR WINDS

Miss Winifred Spooner's Record Attempt

MISS WINIFRED SPOONER and F/O E. C. T. Edwards are making an attempt to fly to Capetown and back in record time. It is their hope that the outward journey at any rate will be done in a shorter time than that taken by Mr. R. F. Caspareuthus. Miss Spooner's monoplane has been altered to include a large fuel tank carried in the cabin, thus increasing the fuel capacity to 70 gall. This should increase the range of the machine to nearly 12 hr., allowing flights of 1,000 to 1,200 miles to be made. Their intention is, where possible, to fly all through the night and this increased range should make this just possible, so that a landing can be made in daylight. The first part of the route will lay down through Italy and then straight across to Benghazi, after which, though no official announcement has been made, it is understood they will fly via Juba, Tobora, Broken Hill, Johannesburg, to Capetown. Flying these long distances has necessitated re-arranging one side of the cabin to accommodate air cushions, so that the pilot "off duty" may get some sleep.

They left Croydon early on December 3, en route for Rome, which they hoped to reach the same day.

The Autogiro's Twirl!

ON Saturday, November 29, the Autogiro "twirled" its way into a tree, as the daily Press have already announced. It is hardly an occasion for levity, but the reporter on this occasion does seem to have unwittingly produced the very word we want for describing the flight of this machine. It was unfortunate that the accident resulted in Mr. A. C. Rawson, the Autogiro Co.'s test pilot, breaking his right ankle and getting somewhat severely cut about the body, and Mr. E. H. Alliot, of *Airways*, who was in the rear cockpit, having his face injured. What actually appears to have happened was a misunderstanding as to who was controlling the machine, due to the voice pipe becoming disconnected, with the result that each thought the other was the pilot, and the machine flew into a tree in the grounds of Parke Davies' factory by Hounslow Heath. The whole thing seems to be a very good advertisement for the safety of the Autogiro, as had this occurred with a more normal type of aircraft it is highly probable that it would have spun into the ground and that both pilots would have been killed. We are glad to be able to state that both are progressing favourably, and while Mr. Rawson will not be out of hospital for some weeks, Mr. Alliot will be about again in a few days. The irony of such a crash occurring in the private grounds of a factory where disinfectant and other chemicals are manufactured appears to have been lost in the reports which have already been circulated.

"Do. X" Damaged

THE German "Do. X" flying ship resumed its flight from Bordeaux on November 20, with the intention of flying to Corunna, but bad weather necessitated a landing at Santander; Corunna was reached on November 23. The "Do. X" left again on November 27 for Lisbon, arriving there that afternoon. On November 28, the fusing of an electric wire in the left wing caused an outbreak of fire, as a result of which the covering of the wing was destroyed; apart from this, it is stated that the damage is not serious, and repair

material was at once despatched from the Dornier works, so that repairs should be completed in time for the "Do. X" to resume her flight to the Azores next month.

Mrs. Miller's Adventure

MRS. KEITH MILLER, who had flown from Pittsburgh to Havana—a distance of 1,300 miles—on November 18, experienced an exciting time on her return journey. She set out from Havana for Miami on November 28, and after being seen flying low a short while after starting, nothing more was heard of her until December 1, when, after extensive search by sea and air, all hope for her safety had been abandoned. It appears that a strong gale blew her off her course between Havana and the mainland, and after flying for 7 hrs., with compass out of action, she at last sighted land, which proved to be Andros Island, one of the Bahamas. Mrs. Miller landed safely in the bush, near Kemps Bay, and had to walk some distance before she could get a message through.

The F.A.I. and the Schneider Trophy

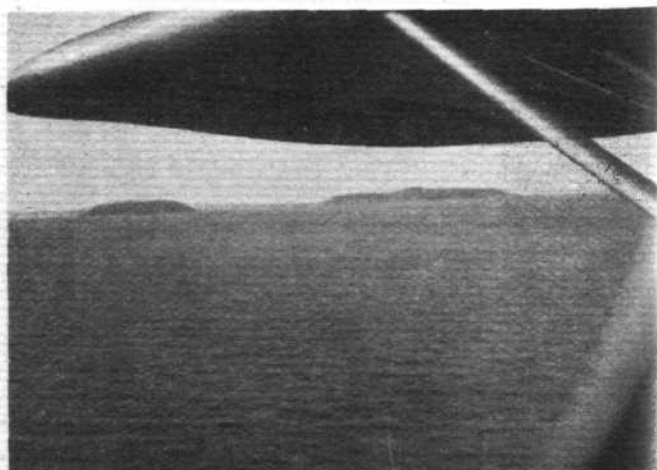
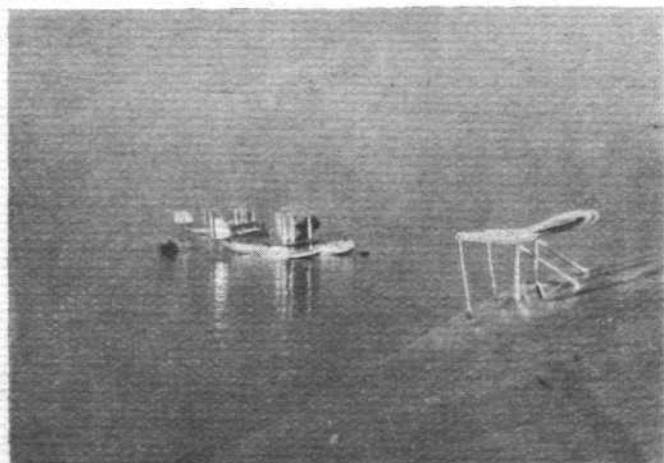
AT a session which concluded on Tuesday, December 2, the Federation Aeronautique Internationale decided that as the aero clubs of Italy and France did not enter an appeal against the refusal of the Royal Aero Club of Great Britain to accept their proffered entries, that refusal stands. It was also decided that entries for the race may be made up to December 31, 1930, and must be accompanied by a deposit of 200,000 francs per machine, the deposit being either in cash or in the form of a banker's guarantee. The deposit is returnable when the machine in question is presented on the day of the contest. It was also decided that the circuit of the course shall be 50 kilometres, and that there shall be no simultaneous starting. The date of the contest shall be fixed for a day between August 31 and September 19, 1931. The whole contest will, as already announced, be held in one day. The aero clubs of France and Italy have agreed to those conditions. They have until the end of the present month in which to make entries, and little doubt is felt that entries from both will be received. The position is discussed in our leading article.

Memorial to Old Etonians

NEXT Saturday, December 6, at 1 p.m., Air Chief Marshal Sir John Salmond, Chief of the Air Staff, will unveil a memorial to 74 old Etonians who lost their lives whilst serving with the Royal Flying Corps, the Royal Naval Air Service, and the Royal Air Force, during the war. The memorial, which consists of an alabaster tablet on which the names are inscribed, under the service crests, has been erected in Eton College Cloisters, directly under Lupton's Tower. The ceremony will be of a very simple nature; relatives and old Etonians who are interested are invited to attend.

International Aluminium Competition

ALL communications concerning the above competition, which is designed to encourage suggestions for increasing the use of aluminium and aluminium alloys, should be addressed to the Bureau International de l'Aluminium, of 23 bis, Rue de Balzac, Paris, France, and not to the British Aluminium Co., Ltd., as previously stated.



AS SEEN FROM THE "Do. X": Two "snaps" taken by Col. The Master of Sempill: that on the left shows two "Southamptons" moored off Calshot, and on the right, passing the Channel Islands.

PRIVATE FLYING AND CLUB NEWS

TOURING in Spain.—The Hon. Mrs. Edwin Montagu, who has just returned from a tour of Spain in her light aeroplane, tells a story illustrative of the development of flying in that country.

When passing over the coast at Valencia, she decided to land, but was unable at once to find a suitable landing-ground. What was her surprise, therefore, to sight a "wind-sock" on the beach. Her pilot brought the machine down on beautifully firm sand, and a courteous Spaniard hurried across the beach to greet them. He was the owner of a café on the edge of the sands and had installed the "wind-sock" on the restaurant roof to attract the increasing number of private flying enthusiasts in his country. He wheeled Mrs. Montagu's machine into the yard behind the café, and took charge of it while she and her pilot visited the town.

He said that the installation of a wind-indicator had been an inspiration, and that many airmen see it and come down for refreshment, the broad stretch of hard sand making a good landing ground.

NEW Landing Grounds for Civil Flying.—During the past year National Flying Services, Ltd., have located 107 landing grounds which it is hoped will be made available in the near future for use by private aircraft and the N.F.S. air taxis.

These grounds help to fill in the gaps between recognised aerodromes and will greatly increase the convenience and safety of flying. They have been approved by the Air Ministry and, if required, may be licensed for regular use as flying develop.

These grounds are not, however, intended as sites for future municipal airports. Eight towns have municipal airports already working, namely, Blackpool, Bristol, Hull, Ipswich, Liverpool, Manchester, Nottingham and Plymouth.

Hanworth Park had a very pleasant evening on Saturday, November 29, when they held one of their periodical Dances and Cabaret Shows. Those who contributed to the success of this latter were the "Australian 3" Band and Miss Perry Brown. In both cases the artistes were extremely versatile, and kept their audience thoroughly amused. The dance was well attended by some 50 people, including Sir Alan and Lady Cobham, and the combination of the excellent Band and a cheery spirit on the part of the dancers ensured sustained enthusiasm until the early hours. The old and tuneful music played by the Band was welcomed by those present as being pleasanter to dance to than some of the most modern tunes, and they were still demanding more when we left, to the strains of "K-K-Katie."

THE JOHANNESBURG Light Plane Club.—This club celebrated its fourth birthday at the end of October, by holding a dance at the aerodrome. Great progress has been

made since the start of the club, as the following figures show. The total flying time each year is:—

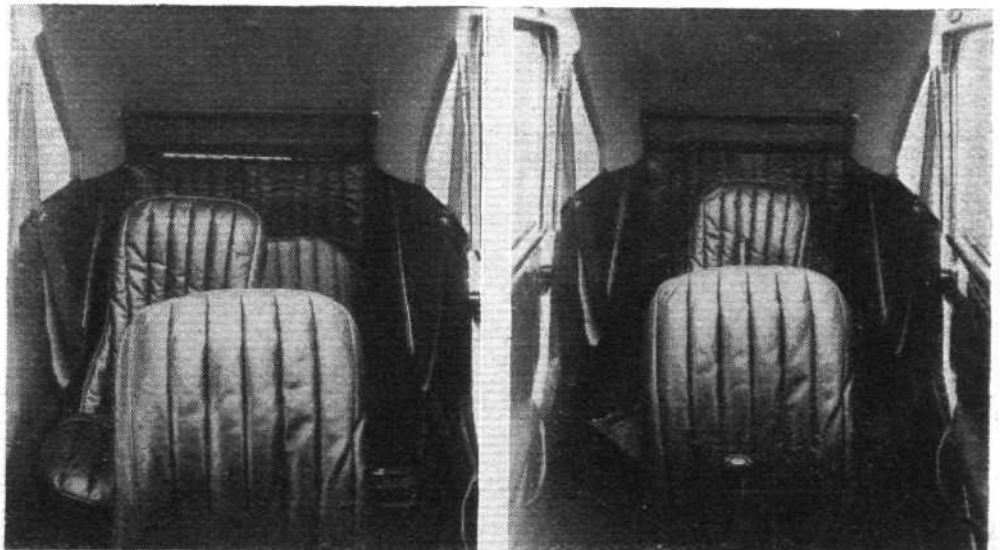
1927	..	..	..	..	..	175	hr.
1928	..	..	..	..	..	1,229	"
1929	..	..	..	..	..	1,164	"
1930	(9 months)	..	..	..	..	1,451	"

In the four years over 6,000 passengers have been carried and 65 pupils have been taught to fly. Besides the two machines they already have, the club has acquired the first D.H. Puss Moth (Gipsy III) to arrive in South Africa. This growth has necessitated radical alterations to the aerodrome, and the hangar accommodation has been increased to over double its former size. From now on, the club will concentrate on flying instruction only, and arrangements have been made with Capt. R. Douglas, head of the South African De Havilland Light Aeroplane Company, to supervise all repairs and renewals of C. of A.'s.

A SERVICE Club.—One of the oldest light aeroplane clubs in the country is now moving with the times and expanding its activities. This is the Royal Aircraft Establishment Aero Club at Farnborough. For many many years—they started as a club directly after the war—their membership and interests have been confined to those actually employed at Farnborough. Latterly, however, their energetic secretary, Mr. P. N. G. Peters, has enlisted members from the surrounding district, and those enthusiastic members, F./O.H. H. Leech and Flt. Lt. C. Mc. Vincent, have volunteered their services as honorary instructors to teach these new members how to fly. The exploits of their ancient Avian G-EBQN. have been well known at most of the prominent meetings during the past few years. Just how the high performance has been obtained from this machine is one of the secrets of the club, and speaks well for their technical ability. In the old days they produced several machines of their own, namely The Hurricane, Zephyr, and Sirrocco. These aircraft more than justified themselves by winning such races as the Grosvenor Cup, and now we hear that a snappy little monoplane will shortly be making its appearance. Unlike many other designers of light aircraft, Mr. Peters has always pinned his faith to low-powered machines and will be using, as usual, a Bristol Cherub engine. We shall await with interest to hear the name of this machine when it is christened!

THE BERKS, Bucks and Oxon Aero Club will be holding a Dance at their club house at Reading on Saturday, December 6, at 8.45 p.m. These dances have in the past been exceptionally pleasant affairs, and those desiring tickets can obtain them, price 5s., from the pilot in charge.

Two inside views of the latest D.H. Puss Moth (Gipsy III) showing the cabin arranged for dual control (right), and as a three-seater (left). The excellent upholstery should be noticed. (Flight Photos.)



FLYING INSTRUCTORS' LICENCES

in Australia.—An order, which shows a keen appreciation of the facts of the case, and which very probably points the way to much-needed improvement in this country, was passed in Australia in May, 1930. Information about this has just come to hand, and it seems that this order practically amounts to the licencing of flying instructors. This action was taken, as it had been found that persons quite unsuited for the work had been giving flying instruction, and, indeed, a passenger was killed while receiving instruction at the hands of a pilot who had qualified for his "A" licence only a short time before the accident, and on investigation, numerous cases were found where it was decided that pilots, although in possession of "B" licences, were incompetent to give instruction. The Department of Defence (Civil Aviation Branch) decided, therefore, to test all pilots, irrespective of experience before permitting them to give flying instruction, after September 1. It is the intention to examine all instructors periodically, in order to ensure that the standard of flying is retained. One of the chief reasons quoted as influencing this decision, was the fact that the department have financial interest in flying training, through the aero clubs who are subsidised, and are desirous of having a system of training which would be uniform throughout the Commonwealth; a system which would be of such a standard as to minimise accidents, both during and after training. The number of pilots registered in the Commonwealth has steadily increased, a fact which is largely attributed to the aero clubs and flying schools. The Australian Aero Club, New South Wales and Victoria sections, commenced active flying training operations in August, 1926, and from that date the number of "A" licenced pilots has steadily increased. A few months later, and then regularly thereafter, a decided increase in the number of "B" licenced pilots became evident, as the following table will show:—

	Class "A."	Class "B."	Total.
31.12.1926	23	48	81
31.12.1927	89	67	156
31.12.1928	182	108	290
31.12.1929	271	157	428

On August 31, 1930, there were 366 "A" licenced pilots and 202 "B" licenced pilots in the Commonwealth, holding valid licences, their distribution being shown by the following table:—

	Class "A."	Class "B."	Total.
Queensland	32	28	60
N.S. Wales	152	73	225
Victoria	92	61	153
South Australia ..	51	14	65
Western Australia ..	37	15	52
Tasmania	1	1	2
New Guinea	1	10	10
Totals	366	202	568



ON "DOUGHNUTS": The above 1931 model Moth is fitted with Dunlop medium low-pressure tyres, and not the Goodyear low-pressure tyre and hub combination, as we were misinformed last week. Dunlop tyres and wheels are, of course, fitted as standard on all Moths. (FLIGHT Photo.)

The following table is interesting, as showing the growth of the Club movement in the Commonwealth:—

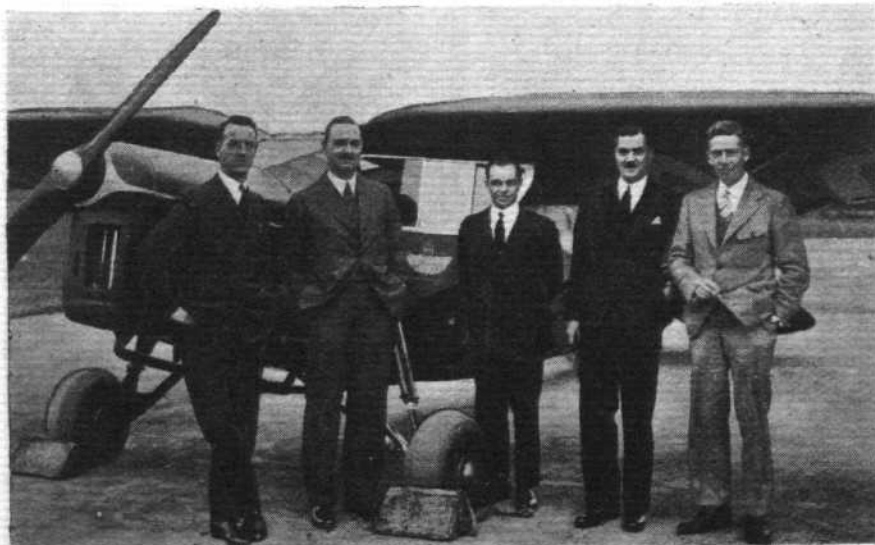
	1926.	1927.	1928.	1929.	1930.
No. of flying schools (clubs and/or commercial flying schools) operating as at end of each year ..	2	5	6	9	—
Number of pupils trained during year	14	70	126	158	147 to 31.8.30
Number of hours flown for instruction	Not available	2,642	4,966	6,346	—
Number of hours flown for practice or other purposes ..	"	1,238	2,924	3,976	—
Total hours flown for all purposes	"	3,880	7,890	10,322	—

BRISTOL and Wessex Aeroplane Club Dinner.—On Thursday, November 27, the Club held a "bachelor" dinner at the Grand Hotel, Bristol, to which the three previous secretaries of the Club were invited as the guests of the Club.

The dinner was a great success, and was followed by an impromptu entertainment in the form of a sing-song.

The presence of the three previous secretaries recalled the early days of the Club when it first came into being at Filton. The first to take charge of the Club's affairs was Colonel G. Flemming, O.B.E., M.C., who is well known in West of England political circles. Colonel Flemming took on the duties of Hon. Sec. from the date the Club was formed.

He handed over control to Captain C. F. G. Crawford, affectionately known as "Uncle Dick," who was the first paid secretary. Then came Major Gordon Cooper, D.S.O., who was the last of the line of secretaries at Filton. Major Cooper is now in charge of the new West Sussex Golf Club at Pulborough, and when leaving to take up this new appointment in February last he was relieved by Captain L. P. Winters, the present Manager of the Club.



This photo was taken at the Weston Airport of the de Havilland Aircraft of Canada, Ltd., and shows, left to right: V. O. Levack, de Havilland Chief Engineer; R. A. Loader, Manager of de Havilland Aircraft of Canada; Sqdn. Ldr. Bert Hinkler; Capt. C. D. Browne, Manager for Canada of C. C. Wakefield & Co., Ltd., Mr. Hinkler's host in Toronto; and Major Geoffrey O'Brian, de Havilland pilot

AVIAN Developments.—We recently had the pleasure of trying out a Sports Avian, in which the engine has been mounted on "Silent Bloc" fittings. The result is amazing, and no one can now accuse the Avian metal fuselage of magnifying the normal engine vibration. With the engine fitted in this manner, the whole running is so smooth that one's impression is that everything cannot be as it should be, or that the engine has ceased to exist. This is naturally far more noticeable from the rear cockpit, but even from the front cockpit there is a very marked increase in comfort.

BROOKLANDS School of Flying, Ltd.—The flying hours during the month of November were ninety. The last fortnight has seen a decrease, due to the bad weather; consequently several pupils are waiting for the blue sky to accomplish height tests, and so on.

It is a pleasure to announce that the Ground Engineer's Course is now in full swing, and that it is being supported by several well-known private owners and budding ground engineers. Full particulars can be obtained upon application to B.S.F.

ON PILOTS' LICENCES.—The present seems a very appropriate time at which to revise the whole subject of pilots' licences. Revision seems to be called for, but such a revision is, of course, fraught with far more difficulties than the average person outside the Air Ministry realises. We are reprinting an article below on the subject from the current number of *The Elevator*, which, as everybody interested in flying knows, is the journal of the Lancashire Aero Club. Mr. Alan Goodfellow, the editor, has wide experience both of the practical and administrative side of flying in general, and since his views coincide, on nearly all points, with our own, we do not think that we can do better than give publicity to his article. No doubt such a revision as he suggests will raise a great deal of criticism, and we shall be pleased to have the views of any pilots who care to send them to us. At a later date, we hope to find space for a further discussion on this subject, carrying on from where it now leaves off, and going into such matters as the advisability of amending existing "B" licence regulations, instituting an intermediate licence, and having a special licence for instructors; also the status of those holding second-class Navigators' certificates.

Of late years, and especially at the moment, the subject of pilots' licences has come in for a good deal of discussion and criticism. The critics of the present system may be divided into two main classes—those who believe in the necessity for licence tests, but wish to see the qualifying tests amended or brought up to date, and those who consider that no qualifying tests should be imposed at all. There are also those who consider that the "B" licence tests should be retained, but that no tests should be required for the "A" pilot.

The present flying tests for the "A" licence require the pupil to obtain his F.A.I. Pilot's certificate. To do this, he must perform a series of five figures of eight, followed by a landing within 50 yards of a predetermined mark. He must also, in a separate flight attain a height of 2,000 m. (about 6,500 ft.) and descend without engine not more than 150 yards from a predetermined mark. All the flights and landings must be made to the satisfaction of an official Royal Aero Club Observer. Finally, the pilot must have completed at least three hours solo flying, before applying for his certificate. After the practical tests are completed, various papers must be sent to the R. Ae C. together with £1 ls. and three photographs. The pupil must also pass a test on the Air Navigation Orders, which consist of a mass of details as to lights, prohibited areas, warning signals, air traffic rules and the like. In due course the certificate arrives and must then be sent up to the Air Ministry together with another form, three more photographs, another 5s., and a certificate of medical fitness.

After further waiting, perhaps 10 days, perhaps three weeks or longer, after he has passed his tests (the time varies according to the business or otherwise of the Air Ministry department concerned) the pupil receives his "A" licence. Until it arrives he may not carry a passenger and must fly only in the immediate vicinity of the aerodrome. Once it is in his hand, however, he is legally entitled to fly all over the country on any type of aircraft carrying whatever passengers or goods are entrusted to him for free carriage and to take on any commercial flying job which does not involve carrying passengers or goods for hire or reward. That is the legal position. Practically, of course, it is far different, since his club or flying school will impose many safeguards and restrictions upon his flying for many hours to come, while no commercial concern would dream of giving him a job—except on his own machine and at his own risk.

Before going on to the "B" licence conditions, let us consider for a moment the tests for the "A." The figure-of-eight tests are good, for there is no better test of a young pilot than his ability to execute a series of turns in alternate directions without losing height or position. The mark landing tests are also good and should encourage the instructor to give the pupil plenty of forced landing instruction. The height test is definitely bad and has been responsible for a good many accidents. The prevailing bad visibility in this country often causes the pupil to lose sight of the aerodrome and his lack of experience prevents him from finding it again, so that he has to make a forced landing. The descent from a height (the last 1,500 m. of which must be accomplished with the throttle closed) allows the engine to get much too cold; consequently if the pupil misjudges his glide, he finds the engine failing to answer the throttle when he is most in need of it. Finally, the prevalence of low clouds may mean that he has to wait a very long time (especially if he can only spare week-ends for flying) before he can accomplish the tests. As regards the "ground" tests, the medical examination at the moment is probably too stiff in the first place, while it is not at present repeated periodically (though the Air Ministry has the right to require it). One suggests that for the amateur pilot the test should only be searching enough to prove that he is not likely to lose consciousness in the air, but that he should be required to sign a declaration on each annual renewal as to any serious illness from which he has suffered during the year.

The examination on the Air Navigation Directions is a mixture of good and bad. Many of the questions relate to matters entirely unimportant to the average amateur, the answers to which he learns by rote and promptly forgets. On the other hand, many practical questions on such matters as starting engines, picketing, and so on, which are vitally important, are outside the scope of the A.N.D.'s. It is nearly two years since the writer raised the question of these tests in the General Council of Light Aeroplane Clubs, and subsequently before a joint committee of the Air Ministry and the Royal Aero Club. It was agreed then to press the F.A.I. to cancel the height test and to substitute a 50-mile cross-country flight, the pupil to be accompanied by an instructor who would give a certificate, if earned, to the effect that the course had been kept and the whole flight performed without assistance or interference from him.

The fact that the question is being allowed to lapse does not matter vitally at the moment, for all the flying clubs and schools in this country do, in fact, insist upon very much higher and more sensible standards than the legal requirements. It does not necessarily follow, however, that a time will not come when newly-founded commercial flying schools, anxious only to get their pupils qualified at the smallest possible cost to themselves, will constitute a menace under the existing regulations. As a basis for thoughtful consideration, therefore, the following suggestions are put forward:—

- (a) The figure-of-eight tests to remain unaltered.
- (b) The height test to be abolished, but a certificate to accompany the application to the effect that the applicant has flown at a height of at least 4,500 ft., either alone or with an instructor.
- (c) A 50-mile cross-country flight over a triangular course with an instructor to take the place of the height test.
- (d) A landing to be made without engine from a height of 1,000 ft., not more than 50 yards from a mark. (This test may be taken in conjunction with (a) if desired.)
- (e) Minimum solo time to be increased from 3 to 5 hours.
- (f) The medical test to be on similar lines to the tests now being introduced for motorists (*i.e.*, reasonable eyesight and freedom from physical defects likely to cause unconsciousness or loss of control). Medical examination to be compulsory on application. Renewal applications to be accompanied by certificate of fitness from the applicant.
- (g) The oral examination to be revised, so as to include a knowledge of common-sense precautions which ought to be taken by pilots and to exclude unimportant points of International Air Law.

It is further suggested that the validity of the Licence should be limited to:—

1. Non-commercial flying only.
2. The type of aircraft on which the tests are made.
3. Daylight flying only; but that additional types and night flying should be included by endorsement on proof of the appropriate experience and ability.

Proposals for an intermediate licence and for the amendment of the existing "B" Licence regulations will be put forward next month.

GLIDING

WORTHING and District Gliding Club.—This club was formed three months ago with its headquarters at the Central Hotel, Worthing. A demonstration was given on Sunday, November 23, at the club's gliding ground at High Totton. Mr. Lowe-Wylde, who has supplied the club with a B.A.C.2 training glider, gave a short talk on the principles of gliding, before making the first flight. Mr. Brian Thynne, a light aeroplane owner, through whose kind offices the club have secured their glider site, then made the first flight by a club member. He showed that being an aeroplane pilot gives one definite advantages when it comes to gliding, and he made a remarkably good flight though he had never flown a glider before. As, however, often happens at gliding meetings, the next attempt by a novice resulted in slight damage to the glider, which mishap terminated proceedings for the day. Repairs were, however, put in hand at once, and the club will carry on gliding, weather permitting, every Sunday during the winter. The gliding site is situated 7 miles N.W. of Worthing, and is suitable for gliding in any direction of wind. It is unique in being totally enclosed by a wire fence, and is privately owned. The property, which is over 250 acres in extent, consists of springy downland turf, and is entirely free from mole hills, gorse or other bushes, and any form of obstruction. Experts have remarked that it is one of the best sites they have seen. The club also has the use of two vacant cottages half-way up the slope, and these are being adapted to provide hangar space, a club room, a store room, a workshop, a ladies' room, and even sleeping accommodation will eventually be arranged. It is proposed to establish a gliding club camp on the site during the summer, and though terms have not yet been discussed, club secretaries who are interested should bear this in mind. The entrance fee is at present £1 1s., with an annual subscription of £2 2s. Those who are interested should apply to the hon. sec., 101, Rowlands Road, Worthing.

GLIDING at Manchester.—The gliding section of the Manchester branch of the Royal Aeronautical Society has now completed a training type glider, and at Farcombes Farm in the neighbourhood of Mottram, a suitable site has been secured where it will be tested out. Col. the Master of Sempill gave a talk on gliding before the society, which included a great deal of advice very helpful to the club in the management of this, their first machine.

ANOTHER Gliding Club.—The Banbury Motor Cycling Club have recently decided to form a gliding section, and a site is being looked for at Fenny Compton, in the Dassett hills. Capt. Gardiner has been appointed Secretary and Treasurer, and Mr. E. Kierce the Captain.

THE DORSET Gliding Club has prepared a new book entitled "Gliding," which will make its appearance early in the new year. This is a co-operative effort by the leading authorities of the gliding movement. Anyone who is interested should write to the Hon. Editor, 10, Franklin Road, Weymouth.

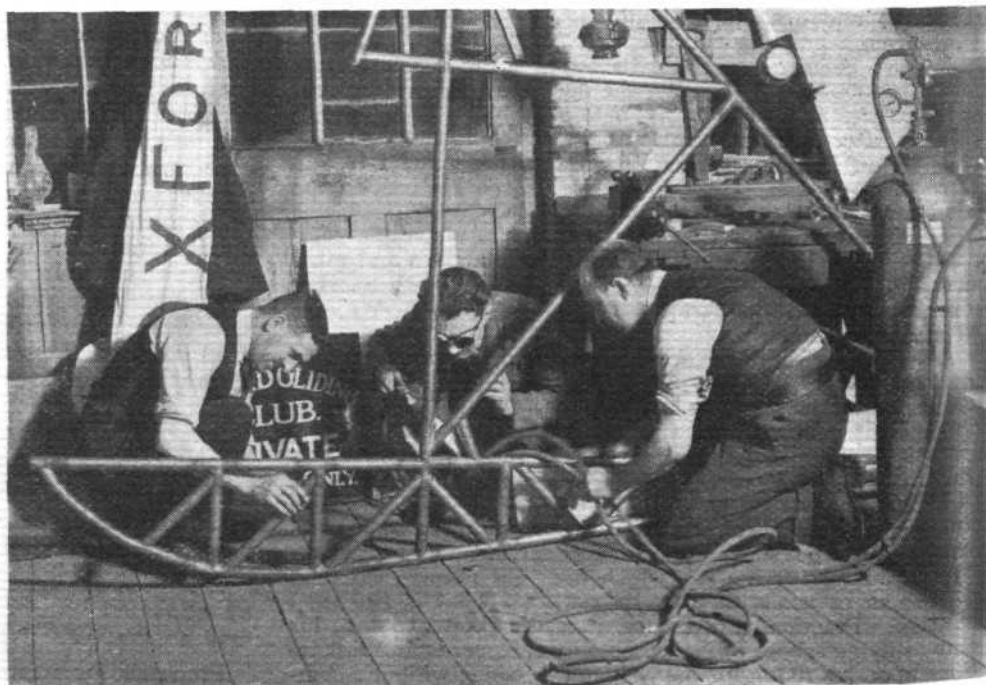
EXCITEMENT in Gliding.—News has just been received that the gliding section of the Royal Aero Club of Catalonia is using a new method of launching. It will undoubtedly add that thrill to gliding which will make this sport worth while for those who feel that nothing less exciting than bull-fighting is a man's sport. Their method is this:—The launching rope, instead of being handled by two groups of men, is stretched by motor-cars. Whether these are run at the same speed and are of identical make, the reader is left to guess, but no doubt added thrills are provided when one car goes faster than the other, and we imagine that the unfortunate pilot must be robed in a suit not unlike that Michelin man that we have seen riding round on their advertisement van! As far as the gliders are concerned we can only assume that they are held as of little value as bulls.

THE ASSOCIATED Gliding Clubs of Queensland recently held an exhibition of gliders at Brisbane. Among the many clubs who exhibited finished gliders and incomplete parts showing the method of assembly, were the Yeronga Gliding Club, the Avian Club (Chelmer) Southport Glider Club and the Queensland Glider Association, Milton. The standard of workmanship was exceptionally high, and many original designs were seen. An outcome of the Show appears to be that all clubs secured many new members, and new clubs have been formed at Coorparoo and Indooroopilly, while clubs are being formed at Beaudesert and Ipswich.

THE Isle of Wight Gliding Club.—A steady north wind proved ideal for gliding on Sunday, November 30, and members were able to take advantage of the slight slope on the aerodrome under these conditions. In all some sixty launches were successfully carried out, and at the end of the day the glider was returned to the hangar intact... this making the fourth time in succession!

Members have now reached that stage of proficiency that they are able to land the machine without removing large pieces from the aerodrome surface or damaging the glider.

Experiments have been carried out with launching, using a car in place of the usual crew. A length of rope, which will place the car out of the range of possible flight, is attached to the "bungee," which in turn is fixed to the machine in the orthodox manner. A much faster take off and longer glide has been found possible with this method. The "bungee" falls clear directly the nose of the glider is pulled up. The metal struts have proved quite successful, and so far no breakages either of strut or wing spar have occurred. Work on the dual control machine still progresses, while the drawings and plans for an advanced type of two-seat glider are now completed. Work on this machine will commence shortly.



The Oxford and County Gliding Club at work on their all-metal glider fuselage.



AIR TRANSPORT

THE TRANSATLANTIC AIR MAIL SERVICE

DURING the last few weeks there have been reports in the Press regarding the establishment of a trans-Atlantic air mail service, and that Pan-American Airways, of America, and Imperial Airways of Great Britain, were actively interested in the scheme. Perhaps it may be as well if we record now the actual position, so far as we have been able to gather the facts.

Reports from the American side have been much more optimistic than those given out on this side. It was stated that Maj. Woods Humphery, of Imperial Airways—who has been on a visit to America—and Mr. Juan Trippe, President of Pan-American Airways, were to discuss plans for the operation, in the near future, of such a service by the two companies. The United States Post Office, it was further stated, had announced that the plans had advanced so far that it was expected the service would begin within a year and that everything had been arranged except equipment, landing places, etc. The line would run from New York or Charleston to Bermuda, thence to the Azores.

We were informed by Imperial Airways, Ltd., however, that Maj. Woods Humphery visited America to study technical developments in aviation there, and that while he might possibly discuss the question of a transatlantic service, it was unlikely that this would materialise for some years to come. It was pointed out that in the first place we had not any machines capable of accomplishing such a flight as that between Bermuda and the Azores.

On November 29, however, it was announced that the U.S. Post Office had invited tenders for a contract for a weekly air mail service between the United States and Europe. Tenders would be opened on December 29.

The route is to be from New York via Norfolk, Virginia, or Charleston, South Carolina, to Hamilton, Bermuda, and thence by way of the Azores to a point in Europe to be specified later by the Postmaster-General. The contract is to run for ten years, starting on June 1 next year, but the contractor is not to receive payment for the flights between the United States and Bermuda until he has established the service over the remainder of the route. The establishment of the

section between Bermuda and Europe, however, is not required of the contractor until July, 1932, or even later, if the Postmaster-General thinks desirable. Should this turn out to be impossible, new arrangements will be made regarding the United States to Bermuda section of the route.

Whether or not Great Britain will play any part in this scheme remains to be seen, but according to one report, bidders and contractors must be citizens of the United States, and no corporation which is not organised under the laws of the United States will be eligible to bid. Its president and managing directors must be United States citizens, and "the title to at least 75 per cent. of its stock must be vested in citizens of the United States, free from any trust or fiduciary obligation in favour of any person or persons not citizens of the United States, and must be free from control, by any means whatsoever, by any person or persons not citizens of the United States or by any corporation controlled" by non-American citizens.

As regards the feasibility of the scheme, it is perhaps difficult to say emphatically that it is premature—for although it is true that it is doubtful if we have any machines to-day possessing the performance or qualifications necessary for a regular service such as this, it must not be forgotten that the big seaplane is now developing very rapidly. The large German "DoX" flying-boat is said to have satisfied its designer as regards performance, while our own large commercial flying-boats now under construction—the six-engined Supermarine monoplane, the Short four-engined "Calcutta," and the Blackburn "Nile" three-engined monoplane, must be kept in mind.

Furthermore, America also has been developing the large commercial flying-boat, and the Sikorsky, Consolidated, and American Savoia machines at present in use have, we understand, given satisfactory results—especially the Sikorsky flying-boats, which have been operating successfully on the North-South America air routes for some time now. Larger 40-seater Sikorsky machines are now under construction, which are expected to provide as good—or even better—performance qualities as the smaller models.

BRITAIN'S MUNICIPAL AIR PORTS

FROM time to time the Air Ministry issue a report showing the progress made regarding the establishment of Municipal Aerodromes throughout Great Britain and Ireland. We published one of these reports in our issue of April 4 last, and below we give the report on the state of affairs up to October 31. Although, on comparing these reports, it would seem that little progress has been made, actually, we think we are right in saying that the position is much more satisfactory, for of late much greater interest and more serious activity regarding this question have been displayed by many of the municipalities. It is to be hoped that next year will see many more towns added to the first two sections of the list, concerning some 151 towns, as it stands at present, which is as follows:—

*Towns which have licensed aerodromes (8).—*Blackpool, Bristol, Hull, Ipswich, Liverpool, Manchester, Nottingham, Plymouth.

*Towns which have purchased sites (4).—*Carlisle, Sheffield, Stoke-on-Trent, Leicester.

*Towns which have reserved sites in their Town Planning Scheme (12).—*Abergavenny, Basingstoke, Blyth, Chorley, Littlehampton, Lytham St.

Annes, Poole, Rotherham, Skegness, Southwold, Winchester, York.

*Towns which have had sites inspected, or are negotiating purchase (73).—*Aberdeen, Aldershot, Barnsley, Bath, Bedford, Birmingham, Bognor, Bournemouth, Bradford, Bridlington, Brighton, Belfast, Burton, Cambridge, Cardiff, Cheltenham, Chester, Crewe, Derby, Doncaster, Eastbourne, Falkirk, Gateshead, Glasgow, Gloucester, Grantham, Great Yarmouth, Greenock, Grimsby, Halifax, Hastings, Hereford, Huddersfield, Huyton, Inverness, Irvine, Kidderminster, Leeds, Leek, Lincoln, Maidstone, Newton Abbot, Newcastle, Newport (Mon), Middlesbrough, Milton U.D.C., Motherwell, Morecambe, Northampton, Northam (Devon), Norwich, Peterborough, Portsmouth, Rochester, Scarborough, Southampton, Southend, Southport, South Shields, Stirling, Swansea, Taunton, Tynemouth, Walsall, Warrington, Warwick, West Bromwich, Weymouth, Wolverhampton, Worcester, Worthing, Wellingborough.

*Towns which are awaiting inspection of sites (3).—*Gravesend, Harwich, Middleton.

*Towns which have displayed interest in aerodromes other than above (51).—*Airdrie, Barrow, Bexhill, Birkenhead, Bolton, Buckie, Burry Port, Cannock, Caerphilly, Colchester, Coventry, Darlington, Dover, Douglas (I. of M.), Dundee, Dunfermline, Durham, Edinburgh, Exeter, Folkestone, Gillingham, Hamilton, Haywards Heath, Hebburn, Haverfordwest, Jarrow, Lancaster, Loughborough, Luton, Merthyr, Neath, Nuneaton, North Berwick, Perth, Pontypridd, Pwllheli, Ramsgate, Rochdale, Rugby, Sunderland, Salisbury, Shrewsbury, Stratford, Thornton (Lancs), Weston-super-Mare, Walton-on-Naze, Wallasey, West Hartlepool, Winsford, Woking, Yeovil.

Newfoundland Air Service

In our issue for October 31 last, we made brief reference to a proposed air-mail service in Newfoundland. We are now able to give a few more details concerning the scheme. The contract calls for six 2-way trips from St. John's to towns and settlements in the Northern Peninsula. The first trip will probably take place early in January. Newfoundland Airways, the company in question—the principals of which are Mr. A. D. Sullivan and Mr. D. C. Fraser—will

engage in a general aircraft service apart from the Government mail contract. A limited number of tickets will be issued for passenger flights over the city from the temporary aerodrome at Mount Pearl which has been loaned by the courtesy of Mr. Andrew Glendenning. Newfoundland Airways will also give flying instruction, and will place their plane at the service of the public for passenger and express work, when not occupied on Government business. Among other plans, they will offer the use of their plane next summer for hire

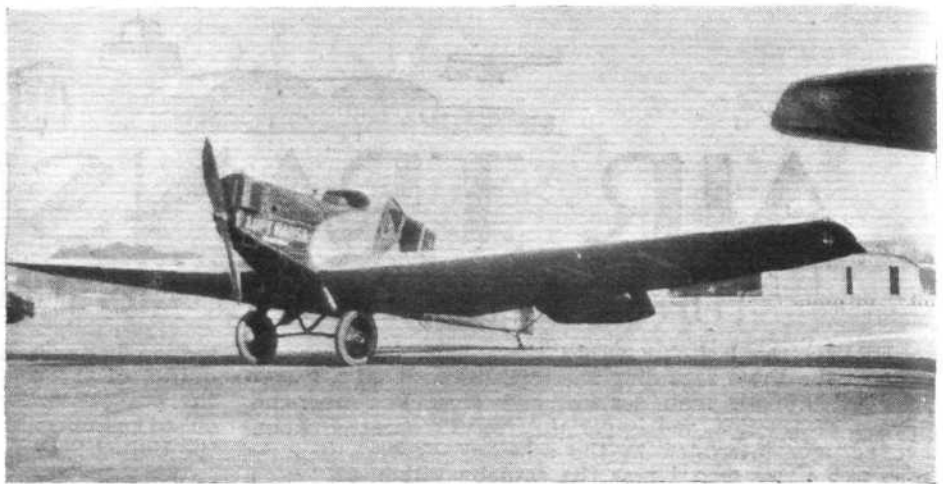
on fire patrol work, and plans are also underway for the undertaking of aerial surveys. The air-mail contract is purely in the nature of an experiment, but it is anticipated that the successful performance of the contract will lead to further mail contracts. Each trip will entail on the double journey from and to St. John's a total of approximately 720 miles of flying. The route is not definite, but will probably be as follows:—St. John's, Hampden, Western Arm, White Bay, Conche, St. Anthony and return. It is anticipated that one flight will be made each week, weather conditions permitting, until the terms of the contract are fulfilled. The aeroplane will have a carrying capacity of 300 lb. of mail matter, or considerably more than 10,000 letters.

Czechoslovak Air Services

NEW air services in Czechoslovakia were outlined for 1931 in the Budget speech of the Minister of Public Works recently. The Czechoslovak Air Lines propose to introduce three new internal services—between Bratislava and Pistany, between Prague and Carlsbad, and between Brno and Moravska Ostrava. A night service will be introduced on the Prague-Brno-Bratislava line. In co-operation with a Swiss company a service will be maintained between Prague and Basle via Munich and Zurich, while an independent service will be conducted between Marienbad and Leipzig. It is also hoped to institute a night service between Prague and Tachov via Plzen to link up with the night service between Nuremberg and Paris via Strasbourg.

Birmingham's Municipal Airport

At a meeting on December 2, the Birmingham City Council decided to authorise the preparation of the scheme for the levelling and layout of a site for a municipal aerodrome for civil aviation purposes, at an estimated cost of £70,000. Alderman W. Byng Kendrick, in submitting the



AN ALL-METAL "CHARLEY'S AUNT": Our picture shows the first Junkers all-metal monoplane, "D-1," placed on service by Luft Hansa in 1919—and still, apparently, going strong, as the photograph was taken during a recent visit to Tempelhof aerodrome.

proposal, said that the site of 200 acres which it was recommended should be acquired was situated on the south-eastern side of the city. It was on the line of the road to Stratford-on-Avon, and less than seven miles from the centre of the city. Experts agreed that the site possesses more of the qualities required for the making of an airport than any other in the neighbourhood of Birmingham. It was not thought desirable to give more detailed information, as it might become necessary to acquire the land compulsorily.

Midland Air Services

IMPERIAL AIRWAYS announce that negotiations are in progress for the reopening next year on a regular basis of the inland air service connecting Birmingham, Manchester, and Liverpool with London. This is in consequence of the successful results obtained during the three months' experimental service operated last summer.

CROYDON WEEKLY NOTES

WE have recently mentioned the great interest that is being taken in the new upright "Hermes II" engine and also in the "Inverted Hermes." It is very cheering to walk through the works of the Cirrus Aero Engine Co., Ltd., at Croydon, and to see the number of men they are now having to employ making these engines. Amongst the foreign orders which have recently come to them are some from Sweden, and we understand that two new designs in this country are being built round the "Hermes." It is too early to say much about these designs, but the results are likely to be very interesting, if not startling.

The upright "Hermes II," which is being shown on the Shell-Mex Stand at the Paris Show is attracting a great deal of attention on account of the 100-hour full-throttle test which it has just gone through. The Inverted engine has been demonstrated recently to the Royal Air Force at Wittering, Digby and Grantham by F/O. S. A. Thorn, the Cirrus Co.'s very popular pilot.

Capt. Muir made very good time last Thursday when he flew from Plymouth to Croydon in 100 minutes. His mount was a Puss Moth belonging to the Henderson Aviation Bureau. He was bringing photographs from the *Mauretania*, and by his speed enabled them to be published in the early editions of the *Evening News*. It is surprising that the *Daily Mail* is the only newspaper which has so far thought it worth while to have its own pilot and machine. The chartering of special aircraft by the other papers is so frequent as to be a very great expense to them. They speak of the telegraphy of pictures, and though this will without doubt supplant aeroplanes for fast transfer, the results are so far rather disappointing, and more novel than satisfactory.

Mr. W. F. Thomas, the contractor, is another who has realised the high cost of private charter. For nearly eleven years he has been using aeroplanes for business trips, but though Capt. Muir will continue to fly for him, he now owns his own "Puss Moth," and expects to find it an economy.

Miss Winifred Spooner's machine was back at Croydon last week, to be prepared for her flight to the Cape. The cabin was quite transformed, and now has on its port side a large petrol tank, which more than doubles the range. On

the starboard side was fitted a bed, so that the "watch below" can relax more thoroughly. Miss Spooner and her navigator, Mr. Edwards, will stand alternate watches at the controls, and change places in the air.

On Monday morning there emerged from a strange car the irrepressible Horsey. It was his first appearance since his motor accident a fortnight ago, when his last "dash-wagon" and his face were both written off. His new face, modelled by the surgeons on that of his son and heir, looks quite nice and attractive. It will look even nicer when it holds itself together without sewing.

We are used at Croydon to the mellifluous tones of American voices. During the summer tourist rush it is as good as a season ticket at the Davis Theatre. This week, however, we were able to learn some real technical terms, as used in the States. One James, a well-known English pilot, was trying out an American power glider when one of its two-cylinder heads blew off. He made a perfect landing. Up dashed the American demonstrator shouting "Why d'you starp the stick, eh?"

Said James "You walk round and look at your port side can, and then you'll know." "Gard," shouted the American, "I told the mechanic change those doggone jugs." "It is fortunate," said James, "that I had a bulkhead between me and the engine." "Bulkhead," asked the American, "bulkhead, wha's thaät? Oh, you mean the fire wahl." The moral is that if you would get the low-down on American Aviation, you must know your onions.

Saturday was a trying day for pilots owing to the fog. But with the help of the Control Tower's excellent organisation, the inward services of all the transport companies reached Croydon. How many a boy there must be, ay, and man too, who envies the control people at such a time. To be letting off unlimited fireworks all day is surely to be paid for pleasure. The new magnesium flare rockets are said to be very effective.

Two hundred and seventy-one passengers and 39 tons of freight have passed through the Air Port during the last week.

M. L.

THE R 101 DISASTER

THE Inquiry into the loss of R 101 was resumed on Wednesday, December 3, by Sir John Simon and the assessors. Dr. H. Eckener had a private talk for half an hour with Sir John and the assessors before the Court opened. Evidence was given concerning the gas leakage on both R 100 and R 101. It was stated that the loss in R 100 (whose gas bags were made by the Zeppelin Company) was three times more than that in R 101. Professor Bairstow said that tests with a model showed that the insertion of the new bay did not materially affect the stability of R 101.

The Australian Victim.—Mr. Green, the Australian Minister of Defence, has announced that the widow of Squadron-Leader Palstra, of the Royal Australian Air Force, who lost his life in the wreck of R 101, would be paid £500 compensation and a pension equal to half of what would have been Squadron-Leader Palstra's superannuation pay.

French Helpers at the R 101 Disaster.—Lord Tyrrell, British Ambassador in Paris, visited Beauvais on Wednesday, December 3, and distributed the rewards conferred by King George on those who helped after the crash of R 101.

The Mayor of Allonne received the C.B.E. and a gold watch and chain bearing the Royal Arms. Two doctors who attended the survivors received silver inkstands inscribed

with the Royal Arms, and the words "R 101, Allonne, October 5, 1930."

Others received silver cigarette cases, silver trays, and brooches. Nuns were presented with rosary boxes, all similarly inscribed. The town of Beauvais was presented with a large silver rose bowl, and the commune of Allonne with a large silver inkstand. A cheque for £150 was given to Beauvais Hospital, while the Mother Superior of the nuns of the hospital received a cheque for £25.

M. Lebeau, Prefect of the Oise, and M. Couhe, Secretary-General of the French Air Ministry, received the K.B.E.

The General Officer commanding the Second Region (France) has cited the following officers, N.C.Os. and men of the Beauvais gendarmerie for devotion to duty following the disaster to the R 101:—

Squadron Commander Serin, commanding the Oise Company; Capt. Roiol, Commandant of the Beauvais section; and General Deboudt, Sergeant-Majors Lesigne and Azambre, and Troopers Dutel and Vandeville, all of Beauvais. Others cited are Capt. Berstchy, of Clermont; Sergeant-Major Gladieux, of Sacy-le-Grand; Sergeant-Major Mancel, of Mouy; and Privates Pelard, of Trie-le-Château, Hélie, of Compiègne, Rumigny and Manouvrier, of Clermont, and Private Poulain, of Méry.

CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

FORWARD ELEVATORS FOR AIRSHIPS

[2351]. I have read, with some interest, a brief note on "Forward Elevators for Airships" in last week's FLIGHT.

I agree with Mr. Laurence Rich that the problem of the airship and the submarine is in some respects similar, as both are governed by the principle of maintaining positive buoyancy and good trim.

The airship has a great advantage over the submarine, with her length and high speed, which give a very good leverage for comparatively small elevator surfaces aft, to work upon; which is sufficient, provided buoyancy is maintained and trimming of ballast tanks carefully attended to.

Forward elevators in airships, corresponding to the submarine's hydroplanes, would set up excessive drag, which, in my opinion, would overcome any advantage to be derived from them.

In any case, it is highly improbable that this problem can have been overlooked by airship designers.

R. ROUGIER CHAPMAN

Folkestone,

November 18, 1930.

COWLING RINGS ON FORD MONOPLANE

We have received from Boulton and Paul, Ltd., of Norwich, the following letter:—

[2352]. We notice in your issue of November 14, on page 1237, a reference to the cowling rings surrounding the "Wasp" engines on the Ford three-engined aeroplane, type 5-AT-C.

This statement reads: "The 'Wasps' . . . have a development of the N.A.C.A. cowling which looks not unlike a Townend ring, but which, as we are assured, is really quite different."

The rings illustrated in your photographs are of the type which has been described in N.A.C.A. Technical Note No. 334. These rings are quite definitely Townend rings. Before this particular type of ring was produced or tested by the N.A.C.A., information concerning the Boulton and Paul type of combined Townend ring and exhaust collector, together with sketches and results of wind-channel tests on this device, had been supplied by our chief engineer, Mr. J. D. North, to

a considerable number of technical people in the United States, including a certain number of the employees of the N.A.C.A. at Langley Field.

The drawings reproduced in the aforesaid Technical Note of the type of ring in question show that, apart from modifications which are necessitated by the position of the exhaust outlets on the "Wasp" engine, these American rings bear a very clear resemblance to the Boulton and Paul design mentioned above.

We think it is also desirable to make it quite clear that the date of application for the original Townend Ring patent is considerably earlier than the date of any publication by the N.A.C.A. of the results of their experiments on cowling for radial engines.

AERIAL WAVES

[2353]. In the Editorial of FLIGHT, October 31, you rather suggest that readers should put forward their opinions for and against dirigibles.

May I put up an argument that I have not yet seen or heard mentioned, and which, in my opinion, is one of the greatest of all against them, this being "the practical impossibility of measuring or even estimating the sizes of waves or surges of the element in which they are supposed to navigate"?

Many of your readers will doubtless remember the difficulties encountered with some of the earlier Atlantic liners, in that they were big enough to bridge two waves and leave their centres unsupported, while still small enough to be lifted by the middle, leaving their ends in the air. This difficulty was surmountable because waves in the sea are measurable and also have a limit to their size. Air waves, gusts, or surges are not really measurable and have no limit as to size.

It is, of course, very possible that this same difficulty may arise when we get to build really big aeroplanes, but that is a long way off yet.

H. H. SQUARE.

Real Club Marítimo,
Santander.

November 6, 1930.

Inspector of Aircraft for Union of South Africa

WE would draw our readers' attention to the advertisement appearing elsewhere in this issue regarding two vacancies for the post of Inspector of Aircraft for the Union of South Africa. It will be seen that applicants must be British subjects, not more than 45 years of age, who are familiar with British A.I.D. procedure, are holders of current "B" and "D" Ground Engineers' licences, and are conversant with the methods of construction and repair of British, Dutch,

and German metal aircraft. For other details we would refer the reader to the advertisement in question on page xxxii.

Death of Mr. D. H. Bonnella.

WE regret to announce the death, on November 28, of Mr. D. H. Bonnella, at the advanced age of 90 years. Mr. Bonnella was Chairman and Founder of the firm of aeronautical, electrical and mechanical engineers, D. H. Bonnella and Son, Ltd., of 46-48, Osnauburgh St., Euston Road, N.W.1.

IN PARLIAMENT

Indian Air Services

MR. MONTAGUE, on November 20, in reply to Mr. Mander, said a weekly air service for the carriage of passengers, goods and mails between London and Karachi is already being operated by Imperial Airways, Limited, under an agreement with the Air Ministry. The company is also operating under charter from the Government of India, an extension between Karachi and Delhi, as an Indian State air service. The Government of India are also providing a series of aerodromes between Calcutta and Victoria Point, but the route will not be ready for operation before the end of the year. The recent Imperial Conference has expressed the hope that an eastward extension of the regular weekly air service between England and India will be inaugurated as soon as possible. Imperial Airways, Limited, have submitted tentative proposals to provide for a weekly air mail service between England and Australia via Calcutta, Rangoon and Singapore; these are at present under consideration. Proposals for the operation of an Indian State air service on the section between Karachi and Calcutta are understood to be under the consideration of the Government of India.

R.A.F. Flying Accidents

MR. MONTAGUE, in reply to Lt.-Col. Heneage, said the number of deaths due to flying accidents in the Royal Air Force this year is 62. This is, I regret to say, an increase over last year's figure, but is paractically the average for the same period in the five preceding years, when much less flying was done. The important point in considering this question is the proportion of fatal accidents to the amount of flying done. For the period January to October, 1930, this proportion, although not so low as in 1929, is considerably lower than for any of the years from 1921 onwards. A downward movement has thus been maintained, though not at a uniform rate. Of the 62 persons killed this year, 35 were in aircraft not fitted with slots or with slots not in operation, while 54 were supplied with parachutes. As regards safety devices constant attention is given to the whole subject of the best means of improving the safety of flying, and to the development of any devices that will do this. As a result, there has been a progressive increase in the safety of flying in the Royal Air Force.

Lieut.-Colonel Heneage: Could not the hon. gentleman cut down the number of flying deaths which have occurred owing to the flying machines not being fitted with safety slots?

Mr. Montague: I am afraid it is necessary for some amount of flying practice to be undertaken in machines not fitted with slots.

Mr. Macquisten: Were there any accidents to machines fitted with slots?
Mr. Montague: There are accidents in machines with slots, but not because of the slots by any means.

Ground Markings (Gasometers).

MR. EVERARD asked the Under-Secretary of State for Air whether, with a view to assisting air navigation he will take steps to see that owners of gasworks in towns have the name of the town painted in white letters on the top of one of their gasometers?

Mr. Montague: The adoption of the suggestion by the owners of gasworks would be welcomed by the Air Ministry, as ground markings of this kind are of assistance to pilots in certain circumstances. At the same time, it is necessary, in the interest of safety, for pilots to study the normal methods of navigation which do not rely upon such aids, and therefore my Noble Friend would not feel justified in putting pressure on the owners of gasworks, as suggested.

Foreign Officers and Royal Air Force Instruction.

SIR N. GRATTAN-DOYLE asked whether the training of foreign officers with the Royal Air Force is balanced by reciprocal action on the part of foreign Powers; and, if not, by what means recompense is made for the services of British instructors?

Mr. Montague: In the great majority of cases foreign officers come for instruction with the Royal Air Force because of the special facilities available in this country, and for that reason the question of reciprocal action does not in practice arise. In any event foreign officers are normally charged a substantial fee in respect of their training.

Enlistment

MR. MONTAGUE, in reply to Mr. Bowen, said the weekly numbers of men who offered themselves for enlistment in the Royal Air Force during the following periods were as follow: Weeks ended May 10, 1929, 218; May 17, 345; May 24, 203; May 31, 252; November 8, 553; Nov. 15, 476; Nov. 22, 282; Nov. 29, 375.

Air Route, Australia

MR. BENN, on December 1, in reply to Mr. Mander, said the Government of India, in connection with the air route to Australia, are co-operating with Imperial Airways, Ltd., but prefer to keep the service across India in their own hands.

Blackburn "Sydney" Flying Boat Tested

THE Blackburn "Sydney" metal monoplane flying boat, fitted with three Rolls-Royce "F.XII MS" engines, was put through its final tests, before being handed over to the Royal Air Force, on November 28, at Brough. These tests were carried out by Sq.-Ldr. Rea, who remained in the air for about an hour and a quarter—time and tide preventing a longer period—and after the test expressed himself quite satisfied with the "Sydney's" behaviour. On the Sunday following (Nov. 30) quite a large crowd collected—about 250 in all—including Press, photographers and news-film people. At noon the boat was brought out of the hangar, and an hour later the Air Force crew, including Flight-Lieut. Weblin and five men, went aboard; the engines were then run up and the boat was launched. The weather was rather unfavourable, there being a fairly thick haze and very little wind. On taking to the water the pilot taxied about the river trying turns in each direction for about 10 minutes, and then did a fast run into wind on the water. On the next run he took off, flew up and down the river for a short time and then landed, after which the motor boat went out to take off two of the Blackburn crew and to get the pilot's signature to the necessary chits, etc. At about 1.40 p.m. they took off again and started on their flight to Felixstowe. Some time later the "Sydney" reappeared out of the mist, and alighted on the water at 3.10 p.m. A motor boat put out to see what was wrong but the pilot reported that thick fog in the neighbourhood of the Wash and visibility of about 100 yards decided them to return to Brough. As it was too late to bring the boat ashore, it was moored up for the night, and beached the following afternoon.

Cirrus "Hermes II" Developments

THE Cirrus "Hermes" Mark II has recently been re-type-tested at 2,000 r.p.m. for a run of 100 hr., on completion of which a further run at 2,300 r.p.m. was carried out. The horse-power at 2,000 r.p.m. was 110, and at 2,300 r.p.m., 117.5. The low petrol consumption of 0.59 pints per b.h.p.-hr. was maintained with an oil consumption of 0.75 pints per hour. The usual subsequent examination showed the whole engine to be in excellent condition. The following accessories contributed to this successful re-rating:—Caudel A.V. 48 D carburetter, Watford S.T. 4/1 magneto, K.L.G. F 15 sparking plugs, Kayser Ellison K.E. 965 valves, Stanavo oil, Midland Motor Cylinder Co.'s aluminium and iron castings, Hoyt white-metal die cast bearings, Hoffmann ball bearings.

Belgium's Good Fairies

As briefly reported in last week's issue, the Belgian Government has placed an order with the Fairey Aviation Co. for 45 "Firefly" fighters (Rolls-Royce "F" engines). This is an extremely gratifying piece of news, for not only is this probably the biggest order ever placed by a foreign Power—and one which may be supplemented by further orders—but

it was obtained in face of keen competition on the part of France and Czechoslovakia, who submitted Dewoitine and Avia machines respectively. At first the Belgian Government proposed to divide its order between these two, when—enter the good Fairey. A "Firefly" was sent over and demonstrated, and its speed and powers of manoeuvre formed a strong contrast to its rivals. Furthermore, sixteen Belgian pilots tested the "Firefly" for themselves, and in spite of the fact that they had never before flown a machine with such a high performance they all put up a "show" that even astonished the British representatives present. As a result, the order for Fairey "Fireflies" was placed!

Akroyd Stuart Memorial Prize and Lecture

THE first Akroyd Stuart Memorial Prize and Lecture has been awarded, on the report of the referees, Professor A. H. Gibson, Professor Dalby, and Wing-Commander T. R. Cave-Browne-Cave, to Mr. D. R. Pye, M.A., F.R.Ae.S., for his paper entitled "The Origin and Development of Heavy Oil Aero Engines." The prize paper will be delivered before the Society in the Lecture Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 6.30 p.m., on Thursday, December 11. The paper "Axial Engines," which was to have been read on this date by Mr. M. L. Bramson, has been indefinitely postponed.

Our Trade Directory

IN the extreme pressure of work occasioned by producing our special British Aircraft Number on November 21, when we introduced our Trade Directory, the firm of Best & Lloyd Ltd., was regrettably omitted. Their name should, of course, have appeared in the sections Power Plant Components and Aircraft Components. Another slight correction to be made is the deletion of the Industrial Rubber Manufacturers Ltd., from this latter section.

The South American Handbook

THE 1931 volume of the "South American Handbook" has now been published and it is more full of information and better got up than ever. This volume appears on the eve of two important events, the British Empire Trade exhibition at Buenos Aires, and the visit to South America of the Prince of Wales. These events make it a certainty that there will be many British visitors to the Argentine and other republics of South America. To these visitors this handbook will certainly be invaluable. We are glad to notice that an Air Section has been added, which gives the latest information about the air services; though we quite agree with the publishers that air travel in this continent is still in its infancy. It is certainly capable of great development, and the country seems (at least great tracts of it seem) very suitable for the operations of airways. Messrs. Trade and Travel Publications, Ltd., are to be congratulated on having produced such an admirable and handy little book for the modest sum of 2s. 6d.

THE ROYAL AIR FORCE

London Gazette, November 25, 1930.

General Duties Branch

Pilot Officer on probation G. F. Humphries is confirmed, in rank (May 1). The follg. Pilot Officers are promoted to rank of Flying Officer:—G. D. Hoyland (July 8); H. R. Black, G. D. Fleming, H. V. L'Amey, F. Lemon, H. L. Messiter, G. W. Phillips, M. V. Ridgeway, A. E. Smith, E. A. H. Tanner (Oct. 14).
Lt.-Cdr. A. P. Colthurst, R.N., Flight Lt., R.A.F., ceases to be attached to R.A.F. on return to Naval duty (Nov. 11).

RESERVE OF AIR FORCE OFFICERS

General Duties Branch.

Pilot Officer on probation K. R. Boulton is confirmed in rank (Nov. 6). The

following Pilot Officers are promoted to rank of Flying Officer:—G. C. Gould (Oct. 3); R. F. Bulstrode (Oct. 5); L. F. Stanley (Oct. 8); J. A. Ingles (Oct. 9); W. R. P. K. Mason (Oct. 9); S. H. R. Clarke (Oct. 11); P. C. Hordern (Oct. 15); E. A. M. Norie (Oct. 15); H. R. A. Edwards (Oct. 15); H. Garnett (Oct. 16); G. P. Jewett (Oct. 19); F. M. Walker (Oct. 20); T. H. Bevan (Oct. 23); J. E. Walker (Nov. 6).

The follg. Flying Officers relinquish their comms. on completion of service:—H. V. Michell (Sept. 2); I. Glyn-Roberts (Sept. 22); H. S. Fulton (Oct. 7).

The follg. Flight Lts. relinquish their comms. on completion of service and are permitted to retain their rank (Oct. 24):—W. S. Watson, J. C. Atkinson.

Stores Branch

Flight Lt. E. P. Terry relinquishes his commn. on completion of service and is permitted to retain his rank (Nov. 11).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Air Vice-Marshal Sir Robert Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 18.10.30.

Group Captain H. M. Cave-Browne-Cave, D.S.O., D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 17.10.30.

Wing Commander B. L. Huskisson, D.S.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 8.11.30.

Squadron Leaders: L. H. Slatyer, O.B.E., D.S.C., D.F.C., to No. 43 Sqdn. Tangmere; 13.11.30. E. D. Atkinson, D.F.C., A.F.C., to half-pay List, 1.10.30. C. N. Lowe, M.C., D.F.C., to No. 2 Flying Training School, Digby; 18.11.30.

Flight Lieutenants: C. W. Hill, to Half-pay List; 11.11.30. W. F. Dry, to R.A.F. Depot, Uxbridge; 15.10.30. S. M. Park, to Stores and Supply Depot, Aden; 15.11.30. G. H. Harrison, to No. 8 Sqdn., Aden; 15.11.30. C. T. Walkington, to No. 47 Sqdn., Khartoum; 15.11.30. C. W. Harrison, to Royal Airship Works, Cardington; 21.11.30.

Flying Officers: A. B. Smith, M.C., C. D. G. Welch, L. S. T. Brown, W. J. Pickard, E. F. Wain, H. S. Martin, all to R.A.F. Depot, Uxbridge; 15.10.30. L. H. Anness, A.F.C., to Elec. and Wireless Sch., Cranwell; 11.11.30. T. L. Harrison, to No. 55 Sqdn., Iraq; 21.10.30. L. E. A. Wright, to No. 58 Sqdn., Worthy Down; 13.11.30. P. S. Cook, to R.A.F. Depot, Uxbridge; 1.11.30. R. R. Bennett, to No. 26 Sqdn., Catterick; 19.11.30. R. Jones, to No. 6 Sqdn., Ismailia; 15.11.30. S. H. C. Gray, to Aircraft Depot,

Karachi; 28.10.30. J. C. Cunningham, to No. 5 Sqdn., Quetta; 28.10.30. W. P. J. Thomson, to Aircraft Park, Lahore; 28.10.30. R. R. Frith, to R.A.F. Base, Gosport; 13.11.30. C. R. J. Hawkins, to Superintendent of R.A.F. Reserve, Hendon; 12.11.30. J. S. Tanner, to R.A.F. Base, Gosport, 13.11.30.

Pilot Officers: D. E. Milson, to No. 25 Sqdn., Hawkinge; 10.11.30. W. F. Hilchie, to No. 5 Flying Training Sch., Sealand; 4.10.30.

Stores Branch

Flight Lieutenant R. H. Latham, to No. 23 Group H.Q., Grantham; 10.11.30.

Flying Officer A. E. Evans, D.F.C., to R.A.F. Depot, Uxbridge; 2.10.30.

Medical Branch

Squadron Leader T. J. Thomas, to Station H.Q., Heliopolis; 11.10.30.

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty:—

Lieut.-Commr. R. St. J. Prentice, to *Victory*, for R.A.F. Base, Gosport; January 6.

Lieuts. F/O., R.A.F.: C. John (Flying Officer, R.A.F.), A. M. Kimmins, to *Victory*, for B.T.S., Gosport; November 22. E. O. F. Price, to *Victory*; December 9.

Sub-Lieut. F/O., R.A.F. M. K. Cavenagh Mainwaring to *Dolphin*; January 5.



R.A.F. SPORT

HOCKEY

R.A.F. v. Lincolnshire.—The R.A.F. hockey XI beat Lincolnshire on November 20 at Bentley Priory, Stanmore, by 3 goals to 2. The R.A.F. goals were scored by F./O. H. E. Sales, F/O. S. C. Bufton, and L.A./C. Newbold. One of the Lincolnshire goals was scored by Flight Lieut. H. N. Hampton, one of the three R.A.F. players who were in the county team. The teams were:—

Royal Air Force.—Corporal C. Butler (Stanmore), goal; Corporal L. G. Beeton (Henlow) and Sergeant N. Z. Foreman (North Weald), backs; L.A./C. D. R. Lodge (Worthy Down), Sergeant W. C. Maher (Upavon), and L.A./C. L. R. Hobbs (Uxbridge), half-backs; L.A./C. Newbold (Sealand), Flying Officer S. C. Bufton (Sealand), Flying Officer H. E. Sales (Bicester), Flying Officer B. A. J. Crummy (Worthy Down), and L.A./C. C. G. Stevenson (Henlow), forwards.

Lincolnshire.—J. A. Medwell, goal; S. Porter and L.A./C. Taylor (R.A.F., Digby), backs; G. H. Black, L.A./C. Adamson (R.A.F., Cranwell) and C. M. Christmas, half-backs; R. E. Scarby, R. E. Frearson, J. E. Searby, Flight-Lieutenant H. N. Hampton (R.A.F., Digby), and R. W. Dodds, forwards.

R.A.F. v. Beckenham.—Beckenham beat R. A. F. on Saturday, November 22, at Foxgrove Road by 3 goals to 2. Both the R.A.F. goals were scored by F./O. Sales. The teams were:—

Beckenham.—A. R. Patterson, goal; V. H. Wilson and J. F. L. Elliott, backs; E. Parker, R. Y. Fison, and E. Owen Thomas, half-backs; F. H. Longley, H. L. Lewis, Captain M. H. Corik, J. H. Pope, and J. D. Taylor Marsh, forwards.

Royal Air Force.—Cpl. C. Butler (Stanmore), goal; Cpl. L. G. Beeton (Henlow) and Sergt. N. Z. Foreman (North Weald), backs; L.A./C. D. R. Lodge (Worthy Down); Sergt. W. C. Maher (Upavon), and L.A./C. L. R. Hobbs (Uxbridge), half-backs; L.A./C. Newbold (Sealand), Flying Officer S. C. Bufton (Sealand), Flying Officer H. E. Sales (Bicester), Flying Officer B. A. J. Crummy (Worthy Down), and L.A./C. C. G. Stevenson (Henlow), forwards.

BOXING.

R.A.F. v. Cambridge University.—Cambridge University beat a team of R.A.F. officers at Marry by seven bouts out of eleven. Details:

Feather-weight.—P. Marx (Jesus) beat P.O. C. E. Littler (Netheravon) on points.

Light-weight.—L. Levy-Teesdale (Christ's) lost to P.O., P.H. Heygate (Sealand) on points.

Welter-weight.—D. G. Oboyskere (Trinity) beat P.O. R. M. Nobleston (Manston) on points; C. N. Godwin (Jesus) beat P.O. B. H. Jones (North Weald) on points; E. W. Denison (Sidney Sussex) beat P.O. G. Calvert (Duxford) on points; J. L. Nolan lost to P.O. G. E. V. Nixon (Sealand) on points.

Middle-weight.—P. A. N. Milmo (Trinity) lost to F.O. F. E. Abbott (Netheravon) on points; B. M. Strouts (St. John's) beat F.O. D. B. McGill (Gosport) on points.

Light-Heavy-weight.—S. W. Dassenaike (Emmanuel) lost to F.O. D. L. Maclean (Henlow) on points; F. W. L. Blaikie (Caius) knocked out P.O. E. L. Brackenbury (Duxford) in second round.

Heavy-weight.—S. Knox Cunningham (Clare), beat P.O. C. R. Davies (North Weald) on points.

FENCING.

R.A.F. v. R.A.C.—The Royal Air Force Fencing Union defeated the Royal Automobile Club at the latter's headquarters in a five-a-side match with the *épée* by 12 defeats to 15, two of the 25 encounters ending in *coups doubles*. The results were:—

R.A.F.F.U.—Chalmers, 1 defeat; Stubberfield, 2; Bellairs, O'Donnell, and Eyles, 3 each. Total, 12.

R.A.C.—Whitehouse, no defeat; Notley and Blaiberg, 3 each; de Agramonte, 4; Mayer, 5. Total, 15.

ASSOCIATION FOOTBALL

R.A.F. v. Spartan League.—On November 28, the Spartan League beat the R.A.F. at Chesham by 3 goals to 1. Oates scored the one goal for the R.A.F. In the face of a strong attack by the Spartans, Chastow played a fine game defending the R.A.F. goal.

R.A.F. INTER-UNIT RUGBY FOOTBALL.

The following matches have been played in the preliminary round:—

Felixstowe	10 points, beat	Martlesham	4 points.
North Weald	9 " "	Hornchurch	3 " "
Uxbridge	6 " "	Ruislip	5 " "
No. 9 B. Sqdn,			
Manston	8 " "	Northolt	0 " "
Worthy Down,	16 " "	Tangmere	3 " "

Service v. Civil

An Aircraft Rugby Football Match

ON November 22, at Netheravon, the Westland Aircraft Works Rugby Football team drew with the Netheravon (3—3). The game was very close, Netheravon scoring their try in the first few minutes, and Westlands gaining their equaliser in the last few seconds. Neither side showed any outstanding skill over the other in any particular part of the field, and were extremely well matched in all respects. The Netheravon team were fast off the mark, generally first down in the scrum, and initiated the majority of the three-quarter movements; these, however, they generally failed to sustain, the Westland team marking their men well and holding them at all times. The general impression was that the Westland men gave the Netheravon team no chance of profiting by their clean heeling and accurate passing, and that they kept the game from being opened out; had the former, perhaps, heeled a little better and passed back sooner, there is no doubt that they would have gained the verdict. Group Captain Barton, the Commanding Officer at Netheravon refereed the game exceptionally well, and was strict enough to keep the game in order, while at the same time avoiding excessive penalisation. The Westland team, which is comprised of employees of the Aircraft Works and Petters' Engine Works, has only been in existence for three seasons, and is to be heartily congratulated on holding their own against a team such as Netheravon.

MODELS

SOCIETY OF MODEL AERONAUTICAL ENGINEERS
(S.M.A.E.)

A MOST enjoyable evening was spent by members of the S.M.A.E. and affiliated clubs, on November 27, when an informal dinner was held at "Le Diner Francaise," Old Compton Street, W.C. The toast of the S.M.A.E. was, proposed by Dr. A. P. Thurston (Chairman), to which Mr. Herbert Jones, of the Halton Model Aircraft Society responded. "The Affiliated Clubs," proposed by Mr. A. F. Houlberg, was acknowledged by Mr. Dent, of "The Model Aircraft Club," and Mr. J. Van Hattum proposed "Model Aircraft Societies Abroad."

A general meeting of the S.M.A.E. will be held at the Y.M.C.A., Tottenham Court Road, on Thursday, December 11, at 8 p.m. Prizes won during 1930 will be distributed, and the dates of the competitions for 1931 arranged.—S. G. Mullins, Hon. Sec., 72, Westminster Avenue, Thornton Heath, Surrey.

THE MODEL AIRCRAFT CLUB (T.M.A.C.)

Parliament Hill.—The weather and the use of another flying field (Lea Marshes—4th Wing, T.M.A.C.) rather reduced the number of active members at Parliament Hill on Sunday last, November 23. In spite of a very adverse and boisterous wind four of the members were able to get in some remarkably good flights from time to time.

The conditions prevailing demonstrated very clearly the necessity of accurate launching, and when a launch was made which was below the standard required the wind beat the model down, and in some cases, with disastrous results. To those who remained, the launching experience obtained will undoubtedly stand them in good stead on competition days.

Mr. Mann was amongst the earlier casualties. Many times did the elements combine to push down his automatically controlled model and on each occasion it came through with flying colours; but the wind grew short tempered (or he grew ambitious), and on the final attempt it attacked in particularly vicious gusts from (apparently) all points of the compass, and the resultant spinning nose dive attained such velocity, that the wing broke in the air. This was very unfortunate, but productive of many new ideas on the subject of spar strength at the point of attachment to the fuselage.

Messrs. Buckland and Fennell were giving good accounts of themselves and we hope to see some great stuff from this section (Kenton & Harrow Squadrons) at the inaugural meeting of the 1st Wing on Hampstead Heath Extension next Sunday.

Mr. C. H. Debenham had his monoplane out fitted with larger tail surfaces and fin which enabled him to put up quite the best flight of the day, both on distance and duration. He also had his "Puss Moth" which was first tried out at the Indoor Flying meeting in the Horticultural Hall, and, although it certainly belongs to "The Midgets," it has a performance superior to some of the larger class of models and is undoubtedly very "life-like" in flight.

"Resurgam" appeared to be giving some trouble getting into trim, but when finally fixed was doing very well towards the end of the morning. At about 12.30 p.m. (noon) a "strange white bird" appeared, to brave the elements; but apparently its owner decided that English conditions were somewhat more exacting than those prevailing "across the pond" and after one short hop it disappeared to await a more favourable day. Its appearance was so fleeting and its departure so sudden that we were not able to get a good view of it, but no doubt the future holds some very interesting developments.

Coventry, No. 9 Squadron, T.M.A.C.—Under the leadership of Mr. M. Pemberton this squadron is going ahead, and the first meeting (non-flying) was held on Saturday last to arrange the members in their various flights. The question of a central flying ground is not yet settled but it is hoped to have this fixed up by the end of the week. Will all modelists in the district who are interested please get in touch with Mr. M. Pemberton, Y.M.C.A., Coventry, or our hon. secretary.

Wimbledon. Wings 10 and 12 T.M.A.C.—Mr. Willis continues to put up remarkably good duration performance with his machines and the consistency of his flights is beginning to be looked upon as the regular thing to look for whenever any flying is taking place upon Wimbledon Common; in fact if he goes on like this the Common will have to be stretched.

Mr. Austin has been out recently with a beautiful biplane model which seems to give every promise of being a star performer in the near future.

Mr. Dent always gives a good show and although his flights

are not of great duration they have the quality of being extremely "life-like."

Mr. Trevethick is putting in some very useful work on the compressed air powered machine, and we understand that in the very near future he will be introducing a new C.A. engine that will far surpass anything that has been attempted in the way of power, weight or speed. Many other models were out, but the weather did its best to prevent them giving of their best. Hon. Secretary: A. E. Jones, 48 Narcissus Road, Hampstead.

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PUBLICATIONS RECEIVED

The Gauge. Vol. 9, No. 1. Oct., 1930. J. J. Habershon and Sons, Ltd., Holmes Mills, Rotherham.

The Air Pilot (Vol. I.). Monthly Supplement No. 13. Sept., 1930. H.M. Stationery Office, London, W.C.2. Price 6d. net.

Technical Notes: No. 342.—Identification of Aircraft Tubing by Rockwell Test. By H. Knerr. June, 1930. No. 344.—Performance of a High-Speed Compression-Ignition Engine Using Multiple Orifice Fuel Injection Nozzles. By J. A. Spanogle and H. H. Foster. June, 1930. No. 345.—The Prevention of the Ice Hazard on Airplanes. By W. C. Geer and M. Scott. July, 1930. No. 346.—Span Load Distribution on Two Monoplane Wing Models as Affected by Twist and Sweepback. By M. Knight and R. W. Noyes. July, 1930. No. 347.—The Pressure Distribution over a Douglas Wing Tip on a Biplane in Flight. By R. V. Rhode and E. E. Lundquist. Aug., 1930. U.S. National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

Aeronautical Research Committee Reports and Memoranda: No. 1324 (E. 36).—Experiments on the Ignition of Gases by Sudden Compression. November, 1929. Price 2s. 6d. net. H.M. Stationery Office, Kingsway, London, W.C.2.

The Sky's The Limit. By Lieut. D. W. Tomlinson. Macrae Smith Co., Ludlow Street, Philadelphia, U.S.A. Price 3 dols. 50.

Anuario del Comercio Anglo-Sudamericano, 1930-1931. South American Trade Annual, Ltd., 74, Victoria Street, London, S.W.1.

Gliding and Motorless Flight. By L. Howard Flanders and C. F. Carr. London: Sir Isaac Pitman and Sons, Ltd., Price 7s. 6d. net.

Flying: An Epitome and a Forecast. By Claude Grahame-White. London: Chatto and Windus. Price 12s. 6d. net.

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AERONAUTICAL PATENT SPECIFICATIONS

(Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

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